

EPC COMMISSION MINUTES & AGENDA

MONTH November

YEAR 1987

ADM-1-1-1

November 17, 1987

MINUTES
ENVIRONMENTAL PROTECTION COMMISSION
Wallace State Office Building
Fourth Floor Conference Room
Des Moines, Iowa
November 17, 1987

The meeting of the Environmental Protection Commission was held at the Wallace State Office building in Des Moines, Iowa convening at 8:30 a.m. on Tuesday, November 17.

MEMBERS PRESENT

Catherine Dunn, Donna Hammitt, Charlotte Mohr, Gary Priebe, Nancy Lee Siebenmann, Keith Uhl, Clark Yeager, Robert Schluetz

MEMBERS ABSENT

Richard Timmerman.

ADOPTION OF AGENDA

The following items were added to the agenda:

- 15a. Memorandum of Agreement--University of Northern Iowa (Decision).
20. Discussion of letter from Lehigh Clay Products, Inc.
Appointments: IBP - 1:00 p.m.; Tom Heston, Ankeny - 2:00 p.m.

Motion was made by Nancy Lee Siebenmann to approve the agenda as amended. Seconded by Donna Hammitt. Motion carried unanimously.

ADOPTION OF MINUTES

Motion was made by Clark Yeager to approve the minutes of October 19-20, 1987 as presented. Seconded by Catherine Dunn. Motion carried unanimously.

DIRECTOR'S REPORT

Larry Wilson reported that the next meeting of the Low Level Radioactive Waste Compact Commission will be Friday, November 20 in Romulus, Michigan. Allan Stokes will represent Mr. Wilson at this meeting and will be accompanied by Ruth Bender. Most of the discussion will center around how the individual states will handle the framing of the compact in their own legislature.

Ruth Bender is in the process of filling some of the positions in the Waste Management Authority Division. Several of these positions should be filled by the end of the year.

APPROVAL OF FY-89 BUDGET REQUEST

Stan Kuhn, Division Administrator, Administrative Services Division, presented the following item.

Approval of the attached staff recommendations regarding the DNR's budget submission to the Governor and the 1988 General Assembly is requested as required by section 455B.105(4).

This summary and the attachments present the DNR's budget request. Major issues as compared to the current level of agency operations and funding include the following:

- *Salary supplemental appropriations and adjustments.
- *Implementation of the Groundwater program.
- *Adequate funding of the 5% sewage works grants.
- *Capitalization of the sewage works revolving loan program.
- *Adequate maintenance and staffing of state parks, forests and recreation areas.
- *Funding for major capital acquisition and development initiatives.
- *State support for multi-state associations.

The primary focus of the budget request process relates to the agency's request from the General Fund. Following is a table presenting the staff recommendation for General Fund appropriations as compared to FY87 and FY88.

Description	Actual FY87	Actual FY88	Request FY89
Operations-Regular	\$ 9,644,596	\$10,529,892	\$12,337,825
Operations-Salary Suppl.	--	437,013	--
U.S.G.S. Coop. Program	185,558	185,983	185,983
Green Thumb Program	138,730	199,800	199,800
5% Sewage Works Grants	1,865,694	1,276,730	2,354,000
5%-Supplemental	--	493,000	--
Sewage Works Loan Fund	--	--	3,285,120
Low-Level Radioactive Waste Compact	45,000	--	78,000
Low-Level Supplemental	--	60,600	--
Miss. Basin Assoc.	--	--	35,000
Miss. Basin Assoc. Suppl.	--	35,000	--
General Fund Capital Acquisition and Development	--	39,960	\$ 2,679,000
General Fund Capital, Suppl.	--	250,000	--
Total General Fund	\$11,879,578	\$13,070,965	\$21,172,728

DNR programs are also financed with a wide array of federal funds, dedicated revenues, and other special sources outside of the State General Fund. These are displayed as part of the recapitulation relating to general department operations, and as those sources relate to special programs.

Staffing. Staffing levels are present as part of each division's financial schedule in terms of Full-Time Equivalents (FTEs). The actual FTE for FY87 (the fiscal year just completed) was 855.55. This was considerably less than the budgeted FTEs, 937, due to General Fund budget shortfalls, and normal vacancies funded by other sources.

Thus, the estimated FY88 FTE level of 978.1 appears to be significantly higher than the FY88 actual. This is due to two factors. First, the FY88 figure assumes all budgeted positions are filled for the whole fiscal year. Just normal turnover and attrition will reduce that figure by approximately 2%. Secondly, an estimated 43 new and additional positions will be added relating to the Groundwater Program and the Waste Management Authority division.

In addition to the Groundwater positions, Parks is requesting an increase of approximately ten FTEs in seasonal positions for improved park maintenance and visitors services, and two full-time park attendants. The Environmental Protection Division is requesting the addition of five new positions in the Floodplains and Dams work unit to cope with existing work load. Geology is requesting two additional FTEs and the Coordination and Information Division is requesting an additional planner.

The budget detail is presented in the attached material as follows:

1. A detailed explanation of the supplemental appropriations requests.
2. A recapitulation of department operations, and a separate analysis for each division. This analysis includes an FTE and expenditure schedule comparing the FY87 actual to the FY88 budget and the FY89 request. Additionally, a schedule is presented for each division showing the 75% base (75% of the FY87 budget, except for federal and grant funds) and decision packages ranked from highest (#1) to lowest. In theory, the "base" and the "decision packages" form a priority array of budget decisions for each division.
3. A summary and narrative explaining the 5% sewage works grant request and priorities.
4. An explanation of the request to capitalize the Sewage Works Revolving Loan Program.
5. A summary of the various capital acquisition and development programs, by funding source, and schedules of individual projects. (These budgets were approved by the Natural Resources Commission at their October meeting.)
6. A summary of the requests for assessments relating to the Low-Level Radioactive Waste Compact and the Mississippi River Basin Commission.
7. The Groundwater budget by "account" as appropriated by the General Assembly. (This was presented to the Environmental Protection Commission at the September meeting.)

Approval of the budget recommendation as presented is respectfully requested.

Discussion followed regarding many issues contained in the budget.

Keith Uhl stated that, on Page 4 of the brief and Page 3-1 of the budget, the wording "Sewage Works Revolving Loan Program" should be changed to Sewage Works Financing Program.

Motion was made by Clark Yeager to approve the FY-69 budget request. Seconded by Donna Hamitt. Motion carried unanimously.

NEW OFFICE LEASE--REGIONAL OFFICE #2--FIELD EVALUATION AND EMERGENCY RESPONSE BUREAU

Stan Kuhn, Division Administrator, Administrative Services Division, presented the following item.

The Environmental Protection Commission will be requested to approve a new office lease for Regional Office #2 of the Field Evaluation and Emergency Response Bureau located in Mason City, Iowa.

The current lease expires November 30, 1987, and can be renewed for one year only. Current rent being paid is \$7.53/ft². This is subject to annual escalation based on utilities and tax increases based on 1977. The size of the office is 1223 ft² and is located at 505 and 509 South President. All amenities are supplied at this cost. Parking at the current address is limited, and handicapped access is inconvenient. Because of the above, it was felt that a new location should be considered.

A total of 20 locations were considered with prices ranging from \$5.40 to \$8.00 per ft². Of the 20 considered, four were physically inspected, and the one offered for approval is the one selected.

The office presented is 1632 ft² with a complete cost of \$5.40 ft² or \$8812.80 annually. This compares with the current cost of \$9578.16. The new location offers complete handicap access, 19-car parking space, and a five-year lease with no escalation clause. All amenities are provided including snow removal, janitorial supplies, and waste pick-up. On-site overnight parking for state vehicles is also included. The location provides quick access to Interstate 35 and State Highway 18.

Stan Kuhn gave a slide presentation showing the current office space for Regional Office #2. Four other possible options for office space were shown.

Director Wilson suggested that the lease allow a release from the contract prior to five years, in case of future co-location of field offices.

Motion was made by Catherine Dunn to approve the new office lease for Regional Office #2 - Mason City, at a cost of \$8,812.80 annually, with the stipulation that a statement be added to allow release from the contract in case of co-location. Seconded by Nancy Lee Siebenmann. Motion carried unanimously.

PUBLIC PARTICIPATION

Chairman Schlutz announced public participation at 10:30 a.m.

Ted Yanacek, Public Affairs Counsel with the Iowa Farm Bureau Federation, addressed the Commission stating his concerns with the registration form and accompanying instructions for registration of agricultural drainage wells. Mr. Yanacek stated that he does not like emergency rulemaking because the public is not properly served in those situations. He urged the Commission to consider revising the emergency adopted rule they adopted last month to

indicate that, if Items 4-8 on the registration form are not completely filled out, it does not disqualify a person for financial incentives, if any are provided. He presented the Commission with a detailed formal statement; a copy is on file in the Records Section of the DNR.

Discussion followed regarding rules and interim period prior to implementation, also what is expected of staff during this period.

Keith Uhl asked that someone comment on the ad hoc committee on groundwater quality standards.

James Combs stated that the department has asked a number of members of state agencies and some from Regents institutions to help evaluate the information, regarding groundwater standards, that will be coming from the six public hearings to be held around the state.

Catherine Dunn stated that she is concerned that only public employees are on the ad hoc committee. She added that the public and private sector should be involved.

Director Wilson commented that when a committee is formed to study groundwater standards, it will be handled fairly, honestly, without prejudice, without bias, and without influence. The recommendation that will come, as a result of the study, will be in the best interest of the people and the environment of the state. Mr. Wilson stated that he hopes the Commissioners will resist any encouragement or involvement of any interest groups, for, against, or wherever they are from. It is best to put the committee together, let them do their work, and the results will be brought to the Commission. Mr. Wilson added that all groups will be represented, but in that process, there should be no outside influence coming to bear on the ad hoc committee from either source.

Chairman Schlutz requested that Nancy Lee Siebenmann be on the ad hoc committee for groundwater standards.

ANNUAL COMPUTER USAGE AGREEMENTS WITH THE U.S. ENVIRONMENTAL PROTECTION AGENCY

Stan Kuhn, Division Administrator, Administrative Services Division, presented the following item.

The Department annually enters into computer agreements with the U.S. Environmental Protection Agency (EPA) for computer time on various established EPA data systems. Such access provides the department with data and data handling services by paying only for computer time, thus saving programming and data storage costs. Below is a listing of all data systems and costs for agreement renewal. All agreements listed would be renewed for the period 10/1/87 to 9/30/88. Some of the systems listed are used at no cost to the agency. They are funded through a credit from EPA.

- 6 -

<u>Data System</u>	<u>Cost to DNR</u>	<u>EPA Credit</u>	<u>Total Cost</u>
1. Model State Information System (MSIS)	\$ 10,000	\$ 0	\$ 10,000
2. Compliance Data System (CDS)	6,000	0	6,000
3. Air Quality Modeling System (AQMS)	2,000	0	2,000
4. Water Quality Storage and Retrieval System (STORET)	0	4,000	4,000
5. Emissions Inventory Systems (EIS) and Air Quality Data Handling System II (AQDHSII)	0	20,000	20,000
6. National Emissions Data System (NEDS)	0	Unlimited	Unlimited
7. Storage and Retrieval of Aerometric Data System (SAROAD)	0	Unlimited	Unlimited
Total Costs	\$ 18,000	\$ 24,000	\$ 42,000

Background

The costs are maximum limits. Actual costs will be based on actual computer time used. Below is a listing and description of each system.

1. Model State Information System (MSIS): Processes water supply analytical data (bacteriological, chemical and radiological) to monitor compliance with the Safe Drinking Water Act. MSIS also assists the Department in complying with annual federal reporting requirements.
2. Compliance Data System (CDS): Processes point source emission data and events to assist the Department in tracking enforcement activities and meeting federal reporting requirements.
3. Air Quality Modeling System (AQMS): Allows the Department access to a number of EPA air quality modeling systems as needed. These modeling systems allow the Department to simulate air pollution situations and obtain potential air contaminant information which would result from the situation.
4. Water Quality Storage and Retrieval System (STORET): Collects water quality data which is used by the Department in monitoring stream quality and developing waste load allocations and water quality standards.
5. Emissions Inventory System (EIS): EPA has hired a contractor to assist the Department in building an Emissions Inventory System. The Clean Air Act requires that an emission inventory be maintained.

Air Quality Data Handling System II (AQDHSII): Processes ambient air quality and meteorological data collected from various sites throughout the state for various pollutants. Detail and summary reports are generated by site and monitoring parameter on a monthly basis which compare results with state and federal standards to assist the Department in monitoring and controlling atmospheric pollution. EPA requires that Iowa provide them with the data in this system.

6. National Emissions Data System (NEDS): This system will be used by the Department to estimate total emissions from point source emissions survey data.
7. Storage and Retrieval of Acoustic Data System (SAROAD): Processes ambient air monitoring data from the AQDHSII system and produces monthly and quarterly detail and summary reports. The system is run in parallel with AQDHSII producing statistics which correspond to state and federal standards that AQDHSII does not produce.

Motion was made by Catherine Dunn to approve the annual computer usage agreements with U.S. EPA at a cost of \$18,000 to the DNR. Seconded by Gary Priebe. Motion carried unanimously.

MONTHLY REPORTS

Allan Stokes, Division Administrator, Environmental Protection Division, presented the following item.

The following monthly reports are enclosed with the agenda for the Commission's information.

1. Rulemaking Status Report
2. Variance Report
3. Hazardous Substance/Emergency Response Report
4. Enforcement Status Report
5. Contested Case Status Report

Members of the department will be present to expand upon these reports and answer questions.

NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION
 ENVIRONMENTAL PROTECTION COMMISSION
 REGULATIONS OFFICE REPORT
 NOVEMBER 1, 1987

PROPOSAL	DRAFT TO COMMISSION	NOTICE PUBLISHED	RULES REVIEW COMMITTEE	HEARINGS	SUMMARY OF COMMENTS & RECOMMENDATIONS TO COMMISSION	RULES ADOPTED	RULES PUBLISHED	RULE EFFECTIVE
1. Ch. 23 - NDRS & MESSAGE	10/22/87	11/10/87		12/09/87 12/10/87 12/11/87				
2. Ch. 28 Private Well Construction Permit	11/17/87							
3. Ch. 91 - Construction Grants	10/27/87	11/10/87		12/08/87				
4. Chs. 100, 102 - Liquids in Landfills	10/29/87	11/10/87		12/09/87 12/10/87 12/11/87				
5. Ch. 102 Storage Sludge at Landfills	11/17/87	*12/16/87						
6. Chs. 100, 103 Landfill Ground Water Monitoring	10/29/87	11/10/87	2/10/87	12/09/87 12/10/87 12/11/87				
7. Ch. 105 - Sniffer Well Criteria	10/29/87	11/10/87		12/09/87 12/10/87 12/11/87				
8. Ch. 143 - Used Oil	4/17/87	8/12/87		9/08/87 9/09/87 9/10/87	10/20/87	10/20/87	11/10/87	12/21/87
9. Ch. 144 - Household Hazardous Materials	11/17/87	---		---	---	*11/17/87	*12/16/87	*11/17/87
10. Ch. 152 - Criteria for Siting Low-Level Radioactive Waste Facilities	8/19/87	9/09/87	10/11/87	10/01/87 10/02/87 10/04/87	11/17/87	*11/17/87	*12/16/87	* 1/20/88

*Projected

MONTHLY VARIANCE REPORT

10/31/87

No. Facility	Program	Engineer	Subject	Decision	Date
1 Kiewit, City of	Wastewater Const.	Mallard, Holland	Lagoon Shaps	approved	10/12/87
2 IDP, Inc.-Store Lake	Wastewater Const.	IDP, Inc.	Activated Sludge Design Basis	approved	10/21/87
3 Niles, City of	Water Supply Const.	ITN Associates	Construction Materials	approved	10/12/87

REPORTS OF HAZARDOUS CONDITIONS

During the period of October 1, 1987 through October 31, 1987, reports of 69 hazardous conditions were forwarded to the Central Office. Two incidents are highlighted, followed by a general summary and the number per field office.

Date Reported and County	Description: Material, Amount, Date of Incident, Cause, Location, Impact	Responsible Party	Response and Corrective Actions
10/19/87 ROSSUTH	A site gauge had broke and allowed about 5,000 gallons of 28% nitrogen fertilizer to leak through an open valve in Fenton, Iowa on October 17, 1987.	Fenton Coop Elevator Box 110, Fenton, Iowa 59539	Contaminated soils were scraped up and applied on land at normal rates of application.
10/28/87 DALLAS	Two storage tanks were being filled with diesel fuel when a closed valve between the tanks caused about 1,000 gallons to overflow the first tank in Booneville, Iowa on October 27, 1987.	Farmland Industries 1661 East Aurora, Des Moines, Iowa 50316	Contaminated soils were excavated, applied on land, and turned to enhance aeration and biodegradation.

Numbers in Parentheses Represent Reports for the Same Period in Fiscal Year 1987

Month	Total # of Incidents	Substance Type				Mode				
		Petroleum Product	Agri. Chemical	Other Chemicals and Substances	Handling and Storage	Pipeline	Highway Incident	RR Incident	Fire	Other
Oct	69 (79)	67 (45) UST-21	4 (0)	18 (34)	53 (53) UST-21	0 (0)	9 (18)	1 (2)	2(0)	4(6)

Total # of Incidents Per						
Field Office	01	02	03	04	05	06
This Period	15	11	3	10	21	9

RE: Enforcement Report Update

The following new enforcement actions were taken last month:

Name, Location and Field Office Number	Program	Alleged Violation	Action	Date
Sky Line Inn Dubuque (F.O. 1)	Water Supply	Sample for nitrate	Penalty/ Order	10/05/87
Donald Hanson, Grand Junction (4)	Underground Tanks	Submit and implement investigation and remediation plan failure to monitor	Order	10/05/87
Des Moines Asphalt Des Moines (3)	Air Quality	Failure to notify of relocation	Order/ Penalty	10/05/87
Cutty's of Chobeji Spirit Lake (3)	Drinking Water	Monitoring and reporting bacteria	Order/ Penalty	10/07/87
City of Lynsville (5)	Water Use	Permit	Order/ Penalty	10/07/87
Ariens's Cafe, Turin (4)	Drinking Water	Monitoring and reporting bacteria	Order/ Penalty	10/07/87
Viking Galley, Ltd. Vinton (1)	Drinking Water	Monitoring and reporting bacteria	Order/ Penalty	10/07/87
Hartman's Riverside Camp #1 Harpers Ferry (1)	Drinking Water	Monitoring and reporting bacteria	Order/ Penalty	10/07/87
Follett's Tap Camarcho (6)	Drinking Water	Monitoring and reporting bacteria	Order/ Penalty	10/07/87
Dale Goodale Osage (2)	Solid Waste	Open dumping	Order	10/07/87
John K. Hansen, Winnipeg Industries Forest City (2)	Solid Waste	C & P site	Order/ Penalty	10/12/87
Stanley Hoer, Hudson (1)	Solid Waste	Open dumping	Order/ Penalty	10/12/87
City of Earlville (1)	Water Rights	No permit application	Order/ Penalty	10/16/87
City of Sheldahl (5)	Drinking Water	Radioactivity	Order/ Penalty	10/16/87
City of Montour (5)	Drinking Water	Radioactivity	Order/ Penalty	10/16/87
City of Purgason (5)	Drinking Water	Radioactivity	Order/ Penalty	10/16/87
Kinballton Utilities (4)	Drinking Water	Radioactivity	Order/ Penalty	10/16/87
Shiloh, Kalona (6)	Drinking Water	Failure to monitor nitrate	Order/ Penalty	10/16/87
Cotter Elementary School Columbus Junction (6)	Drinking Water	Failure to monitor nitrate	Order/ Penalty	10/16/87
St. Cecilia - St. Joe School Boes (2)	Drinking Water	Failure to monitor nitrate	Order/ Penalty	10/16/87
City of Arcadia (4)	Drinking Water	Radioactivity	Order/ Penalty	10/16/87
City of Norwalk (3)	Drinking Water	Radioactivity	Order/ Penalty	10/16/87

Enforcement Report Update

The following new enforcement actions were taken last month:

Name, Location and Field Office Number	Program	Alleged Violation	Action	Date
City of Swan (5)	Drinking Water	Organics Monitoring and Reporting	Order/ Penalty	10/16/87
Bill Shields Warren Co. (5)	Flood Plain	Channel Change	Referred AG	10/20/87
City of What Cheer (6)	Wastewater	NIP	Referred AG	10/20/87
Giese Construction Co. Eagle Grove (2)	Solid Waste	Open Dumping	Referred AG	10/20/87
Kenneth Cooper Minburn (5)	Wastewater	Gas Spill	Referred AG	10/20/87
Country Corner Cafe Pacific Junction	Drinking Water	Penalty/Nitrate Monitoring	Referred AG	10/20/87
City of Sheldon (3)	Wastewater	Monitoring	Order/ Penalty	10/19/87
City of Liscomb (5)	Drinking Water	Monitoring - Bacteria	Order/ Penalty	10/29/87
City of Albion (5)	Wastewater	Monitoring	Order/ Penalty	10/29/87
City of Albion (5)	Wastewater	Certified Operator	Order/ Penalty	10/29/87
City of Albion (5)	Drinking Water	Certified Operator	Order/ Penalty	10/29/87
White Consolidated Industries Webster City (2)	Wastewater	Pre-treatment	Order/ Penalty	10/29/87
City of Winfield (6)	Wastewater	Compliance Schedule	Order/ Penalty	10/29/87
Robert Meekie Sheffield (2)	Air Quality	Open Burning	Order/ Penalty	10/29/87
Harvey Tilling Jasper (1)	Air Quality	Open Burning	Order/ Penalty	10/29/87
Dallage Turbey Grafton (2)	Solid Waste	Open Burning	Order/ Penalty	10/29/87
Kenneth Co. NW (6)	Solid Waste	Daily Cover	Order/ Penalty	10/29/87

Summary of Administrative Penalties

The following administrative penalties are due:

<u>NAME/LOCATION</u>	<u>AMOUNT</u>	<u>DUE DATE</u>
*Shelter Shield (Buffalo Center)	\$1,000	12-03-86
*Cedar Hills Apartments (Dubuque)	1,000	12-29-86
*City of Dysart	400	3-13-87
*Country Corner Cafe (Pacific Junction)	451	8-03-87
JTM Indust./MacDade/Leamer (Pleasant Valley)	1,000	8-12-87
**Ken Turner (Fort Madison)	150	9-15-87
Big Rock Tap	660	9-21-87
*Elings/Catron/Frey (Des Moines)	1,000	10-18-87
Twelve Mile House (Bernard)	339	10-28-87
**K & K Truckstop (Lenox)	62	11-01-87
*OK Lounge (Marion)	448	11-01-87
Timberline Assoc. Ltd (W. Burlington)	1,000	11-02-87
Ottumwa Industrial Airport	1,000	11-23-87
J.C. White Excavating (Des Moines)	1,000	11-29-87
City of Gravity	100	11-30-87
Pleasant Creek Estates (Shellsburg)	200	11-30-87
Keokuk Landfill, Inc.	600	11-30-87
Van Deist Supply Co. (Webster City)	1,000	12-01-87
Northwestern States Cement (Mason City)	1,000	12-01-87
City of Brighton	700	12-04-87
*Lawrence Payne (Ottumwa)	700	12-05-87
Skyline Inn (Dubuque)	290	12-06-87
AMPFL, Inc. (Des Moines)	600	12-07-87
Arlene's Cafe (Turin)	212	12-07-87
Follatt's Tap (Camanche)	448	12-07-87
City of Lynnville	100	12-08-87
Cutty's of Okoboji (Spirit Lake)	212	12-12-87
John Hanson, Winnebago Industries	600	12-12-87
City of Montour	100	12-19-87
Kimballton Utilities	100	12-19-87
Shiloh (Kalona)	100	12-19-87
Cotter Elementary School (Columbus Junction)	100	12-19-87
City of Arcadia	200	12-19-87
City of Hornick	200	12-19-87
City of Earlville	100	12-20-87
City of Sheldahl	100	12-20-87
City of Ferguson	100	12-21-87
St. Cecilia-St. Joe School (Bode)	100	----
City of Shelden	900	----
City of Liscomb	?	----
City of Albion	600	----
White Consolidated Industries (Webster City)	1,000	----
City of Winfield	500	----
Robert Moehle (Sheffield)	300	----
Hawkeye Tiling (Jesup)	1,000	----
Dalluge Turkey Farm (Grafton)	300	----
Kossuth County SLP	700	----
*Chico's Supper Club (Burr Oak)	954	6-10-88

* Referred to the Attorney General
 ** On Payment Schedule

The following administrative penalties have been appealed:

<u>NAME/LOCATION</u>	<u>AMOUNT</u>
Kula and Boge (Martelle)	\$1,000
Handi-Klasp, Inc. (Webster City)	1,000
Munn and Traus (Davenport)	100
Iowa City Regency MHP	1,000
Blonchi Mayrat Lagoon (Des Moines)	600
Thomas E. Lennon (Barnum)	700
Trausch Co., Inc. (Carroll)	1,000
Trausch Co., Inc. (Carroll)	1,000
City of Inwood	400
Clarion Farmer's Coop	750
Great Rivers Coop (Atavia)	1,000
Poweshiek Rural Water	500
Rich Metals (Davenport)	1,000
Village Oaks Homeowners Ass'n (Blue Grass)	424
City of Wapello	500
City of Newell	500
Gradert, Ernest and Kevin (Sibley)	500
Ottumwa-Wapello County SLF	1,000
Stanton Cooperative	1,000
Richard Harstack (Clarinda)	1,000
Mark Wallin (Essex)	1,000
City of University Park	500
City of Mt. Vernon	1,000
Accent Lawn and Leisure (Mt. Joy)	1,000
Wilton Steel Processing (Wilton)	1,000
City of Wilton	1,000
Spectra Health Care (Storm Lake)	580

* Referred to the Attorney General
 ** On Payment Schedule

The following administrative penalties were paid in October:

<u>NAME/LOCATION</u>	<u>AMOUNT</u>
**K & K Truckstop (Lenox)	\$ 25
*Giase Construction Co. (Eagle Grove)	1,000
City of Swan	400
Olen Mark Subdivision (Burlington)	436
City of Ireton	500
Brewer Utilities	50
City of Dixon	200
Linwood Mining (Davenport)	1,000
City of Elkhart	1,000
City of Vincent	100
Hartman's Riverside Camp (Harper's Ferry)	448
Viking Galley (Vinton)	50
Des Moines Asphalt	200
City of Fremont	50
Scotty's Auction Service	500
Everco Industries (Ottumwa)	1,000

* Referred to the Attorney General
 ** On Payment Schedule

DEPARTMENT OF REVENUE
 ENVIRONMENTAL PROTECTION COMMISSION
 AIR/WATER QUALITY DIVISION
 NOVEMBER 1, 1988

Name, Location and Region Number	New or Updated	Program	Alleged Violation	DNR Action	Status	Date
Alden Corporation Council Bluffs (4)	Updated	Hazardous Waste	Release of Hazardous Substances	Referred to Attorney General	Referred	12/16/82
					EPA suit filed	2/26/83
					State intervention	3/05/83
					Notice to discontinue issued	9/23/83
Boyer Valley Company Walsley (4)	Updated	Wastewater	Prohibited Discharge	Referred to Attorney General	Referred	10/27/86
					Consent Decree	12/15/86
Buearth and Bell, Inc. Des Moines (6)	Updated	Solid Waste	Open Dumping	Order	Referred	2/20/87
					Suit Filed	4/23/87
Bryant, Robert E. Charles (3)		Wastewater	Prohibited Discharge	Order	Default Judgment \$7500	6/22/87
					Notice to set aside overruled	10/30/87
Cedar Hills Apts. Dubuque (1)		Water Supply	Monitoring; Operating without permit	Order/Penalty	Referred	2/20/87
					Suit Filed	4/27/87
Chicago Northwestern RR	New	Air Quality	Open Dumping	Referred to Attorney General	Referred	10/20/87
Chick's Supper Club P. Madison (6)	Updated	Water Supply	Monitoring; Operating without permit	Order/Penalty	Referred	3/20/87
					Consent Decree	10/27/87
Casper, Kenneth Mishawaka (5)	New	Storm Tank	Spill Cleanup	Order	Referred	10/20/87
Country Corner Cafe Pacific Junction (4)	New	Drinking Water	Monitoring; Penalty	Order/Penalty	Referred	10/20/87
					Referred	5/21/87
Dewar, City of (5)	Updated	Wastewater	Compliance Schedule	Order/Penalty	Suit Filed	9/30/87
					Referred	6/19/86
Eilers, Duayne Waterloo (1)		Flood Plain	Unauthorized Fill	Referred to Attorney General	Suit Filed	11/01/86
					Default Judgment	1/12/87
Elings, Ceteron Des Moines (5)	New	Solid Waste	Open Dumping	Order/Penalty	Referred	10/20/87
					Referred	5/21/87
Flynn, Robert Keota (6)		Flood Plain	Channel Change	Order	Referred	5/21/87
					Referred	9/21/87
Gerner, City of (2)	New	Wastewater	Compliance Schedule	Order	Referred	9/21/87
					Referred	10/20/87
Glenn Construction Co. Belle Grove (2)	New	Solid Waste	Open Dumping	Order/Penalty	Penalty Paid	10/26/87
					Referred	5/21/87
Hickory Grove MHP Jama (5)	Updated	Drinking Water	Failure to Monitor	Order	Consent Decree	10/26/87
					Referred	9/16/86
Bill Top Ford Yards, Inc.; Northern Corbett Credit Corp. Pottawattomie County (4)	Updated	Wastewater	Discharge	Order	Suit Filed	1/23/86
					Per/Not Lapsed	9/16/86
					Bill Top Disposed	11/ /87
					Retired Set	11/08/87
Jungling Farm, Inc. Dubuque County (2)		Wastewater	Prohibited Discharge	Order	Referred	7/23/86
					Suit Filed	1/20/87
King, James & Julie		Flood Plain	Channel Change	Order	Referred	8/20/87
					Referred	6/29/87
OK Lounge Marion (1)	Updated	Drinking Water	Failure to Monitor	Order	Consent Decree	10/09/87
					Referred	3/21/79
Parmer, A.J. Diagonal (4)		Solid Waste	Operative Violations at Permitted Site	Order	Injunction Issued	2/20/88
					Compliance Date	5/21/88
Payne, Lawrence Ottawa (6)		Solid Waste	Open Dumping	Order/Penalty	Referred	2/20/87
					Suit Filed	4/23/87
					Consent Decree	11/ /87

ATTORNEY GENERAL REFERRALS
NOVEMBER 1, 1987

Name, Location and Region Number	New or Updated	Program	Alleged Violation	DNR Action	Status	Date
Porter Derby Oil Company Barracout (6)		Wastewater	Prohibited Discharge	Referred to Attorney General	Petition Filed Judgment Amended Cleanup Plan Approved	3/ /83 10/12/84 10/24/84 1/27/86
Peppanier, William et.al. Washington County (6)		Flood Plain	Channel Change	Referred to Attorney General	Referred Suit Filed	3/20/87 6/25/87
Riechart Construction Co. Dallas County (5)	Updated	Solid Waste	Penalty Assessment	Order	Referred Penalty Paid	8/20/87 8/26/87
Salisbury, Ronald, Presto-X Dow Moines (5)		Hazardous Waste	Treatment and Storage Violations	Referred to Attorney General	Referred Judgment Appealed to Sup. Court Briefs Filed	9/18/84 5/86 7/86 10/86
Shelter Shield Buffalo Center (6)		Air Quality	Excess Emissions; Construction w/o permit	Order/Penalty	Referred Suit Filed	2/20/87 6/30/87
Shields, Bill	New	Flood Plain	Channel Change	Order	Referred	10/20/87
Wisconsin Barge Service Clinton (6)		Wastewater	Prohibited Discharge	Referred to Attorney General	Referred Suit Filed	11/20/85 7/86
Warner Feedlot (6)	New	Wastewater	Prohibited Discharge	Order	Referred	9/21/87
West Cheer, City of (6)	New	Wastewater	Compliance Schedule	Order	Referred	10/20/87
Wellsen, Robert C. Beech Vista and Chariton Counties (3)	Updated	Wastewater	Prohibited Discharge	Order	Referred Bearing Consent Decree Contempt Finding Contempt Finding Contempt Finding	11/27/84 4/22/86 4/25/86 7/02/86 4/25/86 8/24/87
Woodland Park Jones County (1)		Wastewater	Prohibited Discharge	Order	Referred Suit Filed Temporary Injunction	7/31/86 11/19/86 2/13/87
Woodside Mobile Home Estates Mount Pleasant (6)		Drinking water	Failure to Monitor	Order	Referred Suit Filed	5/31/85 1/24/86
Yocum, Max Johnson (6)	Updated	Flood Plain	Prohibited Construction	Defending Referred to Attorney General	Suit Filed Motion to Dismiss Denied Referred Counter Claim Filed Trial Held Judgment for Department Appealed to Supreme Court	12/18/84 3/06/86 8/07/86 7/12/85 10/86 6/16/87 8/18/87 9/08/87

DEPARTMENT OF NATURAL RESOURCES
 ENVIRONMENTAL PROTECTION COMMISSION
 CONTESTED CASES
 NOVEMBER, 1987

DATE RECEIVED	NAME OF CASE	ACTION APPEALED	PROGRAM	ASSIGNED TO	STATUS
10-17-86	City of Davidson	Administrative Order	MM	Hansen	Hearing continued.
1-23-86	Colson Soil Service	Administrative Order	MM	Leach	Hearing continued; cleanup study progressing.
4-12-86	AW - Clinton	Administrative Order	Air	Leach	Hearing continued.
9-19-86	Kula and Boye	Administrative Order	SM	Leach	Negotiating before filing. Removal completed.
10-29-86	Hessid-Klapp Company, Inc.	Administrative Order	AM/SM/FP	Leach	Hearing set for 11-03-87
12-03-86	City of Hanks	Administrative Order	MS	Hansen	Hearing continued.
12-11-86	Kloise Breen	Permit Condition	FP	Clark	Hearing set for 11-17-87.
12-24-86	Francis Namberlin	Administrative Order	FP	Clark	Hearing set for 12-30-87.
3-18-87	Griner	Administrative Order	FP	Clark	Proposed Decision 10-19-87.
3-25-87	City of Long Grove	Design Denial	MM	Hansen	Proposed decision 9-18-87; affirmed 10-20-87.
3-25-87	Tram and Mann	Administrative Order	SM	Kennedy	Negotiating before filing.
4-06-87 7-16-87	Smitty's Auction Service	Administrative Order	SM AR	Kennedy	Settled.
5-05-87	Don Haines Water SLP	Administrative Order	SM	Kennedy	Proposed decision 8-8-87; EPC reversed 10-26-87.
5-12-87	Yam City Railway M&P	Administrative Order	MM	Hansen	Hearing set for 11-03-87.
5-22-87	Blanchi-Hoynt Lagoon (Hook Smith)	Administrative Order	MM	Kennedy	Hearing continued.
6-02-87	Millon Creek Dam/Zachle et al	Permit Issuance	FP	Clark	Negotiating before filing.
7-30-87	Trench Company, Inc.	Administrative Order	MM/MS	Leach	Hearing set for 11-23-87
6-11-87	Thomas Leason	Administrative Order	FP	Clark	Hearing set for 01-12-88.
8-10-87	Great Rivers Co-op	Administrative Order	MS	Leach	Hearing continued; study progressing.
8-17-87	City of Naples	Administrative Order	MM	Hansen	Hearing held for 10/27/87.
8-17-87	City of Donnellson	Administrative Order	MM	Hansen	Hearing continued.
8-24-87	Risk Metals Co.	Administrative Order	AR	Leach	Settled.
8-27-87	Village Oaks Homeowners Assn.	Administrative Order	MS	Purphy	Hearing continued.
9-01-87	City of Howell	Administrative Order	MM	Hansen	Hearing set for 11-10-87.
9-02-87	City of Mt. Vernon	Administrative Order	MM	Hansen	Hearing set for 11-17-87.
9-17-87	Bradert, Kevin and Ernest	Administrative Order	AR	Leach	Hearing set for 12-11-87.
9-23-87	Deane-Naples County SLP	Administrative Order	SM	Kennedy	New Case.
10-05-87	Bruner County	Permit Denial	SM/AR	Leach	Notice to EPC 11-16-87.
10-09-87	City of Hilton	Administrative Order	MM	Leach	Hearing set for 12-15-87.
10-07-87	Everco Industries, Inc.	SPA Denial	SM	Leach	New Case.
10-15-87	Amant Lawn & Leisure	Administrative Order	AR	Leach	Hearing set for 12-16-87.
10-16-87	Stanton Cooperative	Administrative Order	MS	Leach	Hearing set for 12-18-87.
10-16-87	Hilton Steel Processing, Inc.	Administrative Order	MS	Leach	New Case.
10-21-87	University Park	Administrative Order	MM	Hansen	New Case.
10-23-87	Northbrook, Mallia	Administrative Order	MS	Leach	New Case.

METRO EAST SANITARY LANDFILL REPORT

Allan Stokes, Division Administrator, Environmental Protection Division, presented the following item.

At the direction of the Environmental Protection Commission, DNR staff conducted a three-month study (May-July, 1987) to identify the quality of the surface water and groundwater in proximity to the Des Moines Metro Landfill. Groundwater sampling was conducted at 24 private wells located at 16 residences in the vicinity of Des Moines Metro Landfill. Nine surface water sampling locations on Camp Creek and its tributaries were sampled. Forty-one (41) chemical tests were done on each groundwater sample and sixteen (16) tests were done on each surface water sample. A report on the results of this study will be presented to the Commission.

Mr. Stokes displayed an overhead slide showing a map of the areas sampled in and around the landfill.

Mr. Stokes reported that staff sampled for substances which would be indicators of leachate in terms of synthetic organic compounds, as well as substances which are more aesthetically related. Mr. Stokes stated that elevated levels of nitrate were found in two wells, neither being used for drinking water purposes. They were in close proximity to feedlots, as well as septic systems for the households, and were upstream from the landfill. An elevated level of lead was found in one sample. In checking it out, the homeowner had recently done some plumbing with lead solder, and it is believed that the lead solder was the source of the lead found in the sample. The surface water sources are consistent with use protection for aquatic species. Regarding the groundwater, with the exception of the two elevated levels of nitrate, there was no situation where there was violation of drinking water standards. The final cost of testing was \$30,565 which includes costs for staff to get samples and the UHL to conduct all analyses. Copies of the report are in the process of being distributed to the sixteen residences that participated in the testing, the Metro Landfill Board, and the legislative members that addressed the Commission at the April meeting.

SURCHARGES AND SANITARY LANDFILLS

Allan Stokes, Division Administrator, Environmental Protection Division, presented the following item.

The staff will answer several questions that were posed at the last Commission meeting.

Mr. Stokes informed the Commission that if a landfill is privately owned, a county cannot ban wastes from another county. Counties can set fees along with the state imposed surcharge. Counties can set legitimate fees for the costs incurred by the handling of solid waste disposal from other counties. They cannot set unreasonable fees in an attempt to keep wastes out. If a landfill is privately owned, it would be responsible for collecting the surcharge and paying it to the state. A transfer station would not be required to pay the surcharge as waste is not being disposed at a transfer station.

Mr. Stokes stated that it would take some type of legislative action if the attempt would be to limit the state as the only group or entity that can impose a surcharge, or to put the department in some other role of having approval over surcharges or secondary fees assessed.

GRA-IRON FOUNDRY

Allan Stokes, Division Administrator, Environmental Protection Division, presented the following item.

The situation regarding the GRA-Iron Foundry will be discussed. This facility went into bankruptcy and left various kinds of wastes on the site. It is being investigated as a possible Superfund site.

Allan Stokes informed the Commission that the estimated cost for feasibility study and remediation at this site would be approximately \$220,750. If it turns into a true superfund type of proposition, one could expect the cost numbers to go up substantially.

Chairman Schlutz stated that we need to ask the legislature to set aside money for superfund sites.

Keith Uhl asked that the GRA-Iron Foundry item be put on the agenda next month for a closed session.

NOTICE OF REPORT AVAILABILITY--PESTICIDES IN WATER SUPPLIES USING SURFACE WATER SOURCES

Allan Stokes, Division Administrator, Environmental Protection Division, presented the following item.

A report entitled "Pesticides in Water Supplies Using Surface Water Sources" has been prepared by the University Hygienic Laboratory and DNR staff. The report presents the findings of a special study on pesticides conducted in 1986 as a cooperative effort between the UHL and the department. Copies of the report will be provided to the Commission and a brief summary of the content of the report will be presented.

Summary

A study was undertaken in the spring of 1986 by the Iowa Department of Natural Resources and the University Hygienic Lab to investigate pesticide contamination in water supplies using surface water sources. Samples of treated water were collected from 33 public water supplies which rely on a surface water as their sole source or as one of several permanent sources of water. All samples were collected after a rainfall event and thus represented pesticide levels in treated water affected by runoff. At 14 of these public water supplies, concurrent samples were also collected from the surface water source, prior to treatment. Sampling of water prior to and after treatment provided an indication of the effectiveness of pesticide removal during the treatment process. Each sample was analyzed for 37 pesticide compounds.

Of the 33 public water supplies tested, detectable levels of one or more pesticide compounds were found in 30 of the supplies. Individual pesticides

and the number of supplies in which they were detected were: atrazine, 30; cyanazine (Bladex), 26; metolachlor (Dual), 21; alachlor (Lasso), 17; carbofuran (Furadin), 9; metribuzin (Sencor), 4; 2,4-D, 2; and, trifluralin (Treflan), butylate (Sutan) and dicamba (Banvel), 1 each. Overall in the treated water samples, ten individual pesticide compounds were detected out of the 37 analyzed.

All the pesticides detected in the treated water samples are identified as those most abundantly used on cropland. With the exception of 2,4-D, the pesticide compounds found at the public water supplies tested in this study are not required to be monitored through the federal requirements in the Safe Drinking Water Act (SDWA). In total, the SDWA only requires monitoring for six pesticide compounds in public water supplies using surface water sources. Of those required to be monitored, only 2,4-D was detected in the treated water samples. The remaining pesticides, mandated to be monitored according to SDWA regulations, have limited or no current usage in Iowa.

Results from samples collected prior to and after treatment indicate that conventional water treatment systems are ineffective at substantially removing or eliminating pesticide compounds. Thirteen of 14 water supplies sampling both treated and untreated water had detectable levels of pesticide compounds in the untreated source water. All 13 of these supplies had detectable levels of one or more pesticide compound in their respective treated water samples. Although the water supplies tested provide results from a wide range of conventional treatment systems, evaluating the effectiveness of any one type of treatment system was beyond the scope of this study.

Pesticide concentrations in treated water at 21 of the 33 water supplies tested exceeded preliminary lifetime health advisory concentrations (MCL Goals). Although samples were collected after a rainfall-runoff event, the amounts of rainfall received and occurrence with respect to pesticide application varied among the water supplies tested. Due to these factors, as well as a number of others, neither the frequency or magnitude of pesticide contamination at these water supplies can be ascertained from this study. Concurrently, the frequency at which the lifetime health advisory concentration in those water supplies is exceeded cannot be established.

The findings from this study support the following recommendations:

- commonly used pesticides should be monitored in public water supplies on a regular basis;
- there should be an increased public awareness of the presence of unregulated contaminants in drinking water;
- changes to the Safe Drinking Water Act should be supported to reflect current pesticide usage; and,
- the prevention of surface water contamination through more efficient chemical usage should be emphasized.

NOTICE OF INTENDED ACTION -- CHAPTER 102. "PERMITS"

Allan Stokes, Division Administrator, Environmental Protection Division, presented the following item.

Iowa Code section 455B.304 requires the Commission to adopt rules that prohibit land burial or disposal by land application of wet sewer sludge at a sanitary landfill.

The term "wet sewer sludge" contained in Iowa Code section 455B.304 is taken to mean municipal sewage sludge which contains more liquid than solid, that is, equal to or greater than 50 percent liquid. The proposed rule change adds language to rule 102.14(3)a which restricts burial or disposal by land application of municipal sewage sludge at a sanitary landfill to sludge which has a solids content greater than 50 percent.

ENVIRONMENTAL PROTECTION COMMISSION [567]
Notice of Intended Action

Pursuant to the authority of Iowa Code section 455B.304, the Environmental Protection Commission proposes to adopt an amendment to 567--Chapter 102, "Permits," Iowa Administrative Code.

Iowa Code section 455B.304 requires the Commission to adopt rules that prohibit land burial or disposal by land application of wet sewer sludge at a sanitary landfill.

The term "wet sewer sludge" contained in Iowa Code section 455B.304 is taken to mean municipal sewage sludge which contains more liquid than solid, that is, equal to or greater than 50 percent liquid. The proposed rule change adds language to rule 102.14(3)a which restricts burial or disposal by land application of municipal sewage sludge at a sanitary landfill to sludge which has a solids content greater than 50 percent.

Any interested person may file with the Director written comments on the proposed amendments through January 8, 1988. Interested persons may also provide oral comments at public hearings to be held in Iowa City, Council Bluffs and Des Moines as follows: Wednesday, January 6, 1988 at 1:00 p.m. in the conference room of the Geological Survey Bureau, 125 North Capitol Street, Iowa City, Iowa, on Thursday, January 7, 1988 at 1:00 p.m. in the Community Hall Room, 205 South Main, Council Bluffs, Iowa; and on Friday, January 8, 1988 at 1:00 p.m. in the east half of the fifth floor conference room of the Wallace State Office Building, 900 East Grand Avenue, Des Moines, Iowa.

This rule is intended to implement Iowa Code section 455B.304.

The following amendment is proposed:

Amend rule 102.14(3)a(455B) as follows:

a. Unstabilized sewage sludge, including unstabilized septic tank pumpings, shall not be disposed in the portion of a sanitary landfill open to the public. Municipal sewage sludge, whether stabilized or unstabilized, may be disposed of at a sanitary landfill as provided in Chapter 103 or 121 only if the sludge has a solids content greater than 50 percent.

Date

Larry J. Wilson, Director

Motion was made by Gary Priebe to approve Notice of Intended Action-- Chapter 102, Permits (Sewage Sludge Disposal at Sanitary Landfills). Seconded by Charlotte Mohr. Motion carried unanimously.

REFERRALS TO THE ATTORNEY GENERAL

James Combs, Division Administrator, Coordination and Information Division, presented the following item.

The Director requests the referral of the following to the Attorney General for appropriate legal action. Litigation reports have been provided to the Commissioners and are confidential pursuant to Iowa Code section 22.7(4).

IBP, Inc./Jim Langenfeld - solid waste/water pollution
JTM Industries/Delbert Leazer - solid waste/penalty collection
City of Ankeny - wastewater
Big Rock Tap - drinking water/penalty collection
City of Washington - wastewater
Finlan Landfill - solid waste/tonnage fee collection

IBP, Inc./Jim Langenfeld

Mike Murphy briefed the Commission on the history of this case. Mr. Murphy circulated photos taken August 17, 1987 showing paunch manure disposal. He added that the paunch manure disposal led to water pollution problems, and also violates a rule of the department regarding land application of solid waste. Mr. Murphy stated that another reason in asking for referral was because of incidents in 1986 involving the same parties. Clean-up did take place after the issuance of an administrative order in 1986, and a \$300 penalty was paid by Mr. Langenfeld.

APPOINTMENT -- IBP/JIM LANGENFELD

Mr. Jim Langenfeld, farmer and independent contractor for IBP, stated that he did have a problem a year ago and it was taken care of immediately. He added that he was never told that he had to have a permit. He stated that because of the heavy rains in July and August he had to stockpile the paunch, and he built a dike to catch the runoff. In September, Mr. Langenfeld hired a contractor to spread it. He stated that he did not know that there was a problem until October 13; he contacted Dick Grote and later met with him. He added that everything was cleaned up by the time he received the letter. Mr. Langenfeld explained his plans for future handling of the paunch. It will be dried out and hauled to the field from week to week, rather than month to month. Also, the new area for disposal has over ten miles of terracing on it which will help the problem.

Discussion followed regarding the letter that was sent Mr. Langenfeld and the poor service in delivery from the post office.

Keith Uhl inquired as to Mr. Langenfeld's relationship with IBP, Inc. Mr. Langenfeld stated that he is an independent contractor with IBP, Inc.

Discussion followed regarding penalty factors on litigation reports. Also discussed were the numbers of ammonia and BOD content shown in testing of the pond water.

Motion was made by Keith Uhl for referral to the Attorney General's Office. Seconded by Catherine Dunn.

Discussion followed regarding disparity in proposing fines, involvement of other property owners, lapse in time in notification of violation, and communication with the district office.

Rich Jochum, IBP, Inc., stated that there is not too much he can add to what Mr. Langenfeld has said. He stated that Mr. Langenfeld is a contractor of IBP and is required by his contract to abide by all federal, state and local regulations. IBP also did not know until October 13 that there was a violation. He added that they assumed Mr. Langenfeld was doing the contracted work and everything was running smoothly. As far as the requirement for permits, Mr. Jochum stated that they have always treated paunch as any other animal waste and land applied it, and assumed that the same regulations applied to paunch manure as to manure from a stockyard.

Keith Uhl asked if there is a legal issue about whether or not regulations applied to paunch manure.

Mike Murphy stated that there is a legal issue to the extent they may apply as explained. He added that there has been no problem with taking the material from the plant and applying it in a manner that would not cause any problem; this would not require a permit. He further stated that in this case there was large-scale storage which is an activity that does need a permit. Mr. Murphy explained that if Mr. Langenfeld changes his practices as he stated he is planning to do, he may not need a permit.

Mr. Murphy stated that the department needs a waste management plan from Mr. Langenfeld, and IBP should be involved in the process of that plan. IBP needs to know where their waste is going and assure that it is being properly handled, not assume it is being handled properly. Staff feels referral is appropriate because this is a repeated violation and an administrative order was issued for prior incidents.

Chairman Schlutz requested a roll call vote on the motion by Keith Uhl for referral to the Attorney General's Office. "Aye" votes were cast by Commissioners Dunn, Hammitt, Mohr, Siebenmann and Uhl. "Nay" votes were cast by Commissioners Priebe and Yeager. Chairman Robert Schlutz "abstained" stating that there may be a conflict of interest with IBP, Inc. being located in his hometown. Motion carried 5 to 2.

NOTICE OF INTENDED ACTION -- CHAPTER 38, PRIVATE WATER WELL CONSTRUCTION PERMITS AUTHORIZED UNDER 455B.187

Allan Stokes, Division Administrator, Environmental Protection Division, presented the following item.

The Commission is requested to approve the Notice of Intended Action for Chapter 38 of the IAC.

Chapter 38 of IAC is proposed to implement the issuing of new private water well drilling and construction permits as authorized under Chapter 455B.187, Code of Iowa, as amended by Section 304 (HF631, 1987 Acts).

Upon authorization by the Commission, three public hearings on the proposed rules will be held throughout the state beginning on _____, 1988, and written and oral comments will be received through _____, 1988. The results of the comments and recommendations are scheduled to be brought back to the Commission at the _____, 1988 meeting.

Implementation of these rules will allow the department to issue approximately 2,000 private water well drilling and construction permits per year, and to register about 4,000 existing wells per year.

ENVIRONMENTAL PROTECTION COMMISSION [567]
Notice of Intended Action

Pursuant to the authority of Iowa Code section 455B.187 as amended by 1987 Iowa Acts, House File 631, section 304, the Environmental Protection Commission intends to create a new Chapter 38, "Private Water Well Construction Permits."

Iowa Code section 455B.187, as amended by 1987 Iowa Acts, House File 631, section 304, requires all landowners or landowners' agents to obtain private well construction permits from the Department of Natural Resources prior to the construction of any new wells on their property. In addition, the Department is precluded from issuing a permit to an applicant until all existing wells on the property have been registered with the Department. Also, the authority to issue private well construction permits may be delegated to county boards of supervisors, but the Department retains concurrent authority. Further, all counties may issue emergency drilling permits in those cases where emergency drilling is necessary to fulfill an immediate need for water. The Department intends to create a new Chapter 38(455B), to implement these statutory provisions. Generally, this chapter provides procedures and conditions governing applications for and issuance of private water well construction permits.

More specifically, the proposed rules: (i) define the type of wells requiring construction permits; (ii) require a twenty-five dollar (\$25) filing fee per application; (iii) require all permitted wells to be constructed by a registered driller in accordance with Chapters 37 (Registration of Water Well Contractors) and 49 (Nonpublic Water Wells) of these rules; (iv) authorize each county board of supervisors or the board's designee to grant emergency well construction permits to satisfy an immediate need for water; and (v) provide for a well construction permit to expire after one calendar year from the date of issuance if well construction is not started prior to that date. Further, the proposed rules specify the conditions under which a drilling permit could be denied and outline the appeal procedures. Finally, the procedures for delegating the Department's permit-issuing authority to the counties are specified in addition to the conditions under which such a delegation may be revoked by the Department.

In accordance with Iowa Code section 17A.31, notice is hereby given that these rules may have an impact on small business.

Any interested person may file written comments or suggestions on the proposed rules through _____, 1988. Such written materials should be directed to Victor Okereke, Iowa Department of Natural Resources, Wallace

State Office Building, 900 East Grand, Des Moines, Iowa 50319-0034. Persons are also invited to present oral or written comments at public hearings which will be held on _____, 1988 at _____ at the Iowa Department of Natural Resources, Geological Survey Bureau, Trowbridge Hall, 123 North Capitol, Iowa City, Iowa 52242; on _____, 1988 at _____ in the fifth floor conference room, Wallace State Office Building, 900 East Grand, Des Moines, Iowa 50319-0034; and on _____, 1988 at _____ at the Iowa Western Community College, Continuing Education Building, Room _____, Council Bluffs, Iowa 51501.

Copies of the proposed rules may be obtained from the Records Section, Iowa Department of Natural Resources, Wallace State Office Building, 900 East Grand, Des Moines, Iowa 50319-0034.

These rules are intended to implement 1987 Iowa Acts, House File 631, section 304 and Iowa Code subsection 455B.105(12).

Chapter 38

PRIVATE WATER WELL CONSTRUCTION PERMITS

567--38.1(455B) Definitions.

"Abandoned well" means a water well which is no longer in use or which is in such a state of disrepair that continued use for the purpose of accessing groundwater is unsafe or impracticable.

"Agreement" means a signed document between the department and the county board of supervisors with which the department delegates the authority to issue private well drilling permits to the county board of supervisors or its designee.

"Contiguous" means any number of parcels of land that physically touch one another except that tracts of land separated by roads, railroads, or streams shall be deemed contiguous.

"Contractor" means a person engaged in the business of well construction or reconstruction. The term may include a corporation, partnership, sole proprietorship, association or any other business entity, as well as any employee or officer of such an entity.

"Construction" means the physical act or process of making a water well including, but not limited to, siting, excavation, construction and installation of equipment and materials necessary to maintain and operate the well.

"Department" means the Iowa Department of Natural Resources.

"Director" means the director of the department or a designee.

"Groundwater" means any water below the surface of the earth.

"Inactive water well" means a water well which is not currently in use and is capped or sealed to prevent the entrance of contaminants into the well, but is in such a condition that it can be activated to produce a safe supply of water.

"Landowner" means an individual, trust, partnership, corporation, government or governmental subdivision or agency, association or other legal entity that has legal or equitable title to a piece of land.

"Landowner's agent" means a person who acts for or in place of the landowner by authority from the landowner.

"Private water well" means a well that does not supply a public water supply system.

"Protected source" means a surface water or groundwater source recognized by rule as deserving special protection in order to ensure its long-term

availability, in terms of either quality or quantity, or both, to preserve the public health and welfare.

"Public water supply system" means a system for the provision to the public of piped water for human consumption, if such system has at least fifteen (15) service connections or regularly serves an average of at least twenty-five (25) individuals daily at least sixty (60) days out of the year. Such term includes (1) any collection, treatment, storage, and distribution facilities under control of the supplier of water and used primarily in connection with such system, and (2) any collection (including wells) or pretreatment storage facilities not under such control which are used primarily in connection with such system.

"Water well" means an excavation that is drilled, cored, bored, augered, washed, driven, dug, jettied, or otherwise constructed for accessing groundwater. Water well does not include an open ditch or drain tiles.

567--38.2(455B) Forms. The following application form is currently in use:

Application for a permit to construct a new private water well. 11/87. 542-0988.

567--38.3(455B) Permit requirement.

38.3(1) When permit required. A landowner or landowner's agent shall not drill or construct a new private water well without first obtaining a well construction permit issued by the department or by a county board of supervisors or the board's designee authorized to issue such permits pursuant to rule 38.15(455B). Examples of private water wells requiring well construction permits include, but are not limited to: domestic wells, livestock wells, irrigation wells, recreational wells, monitoring wells, heat pump wells, industrial wells, and dewatering wells.

38.3(2) Exemptions. Examples of excavations that are not private water wells and so do not need private water well construction permits and need not be reported include, but are not limited to: soil borings, percolation test holes, sand and gravel and limestone exploration holes, excavations for storing and extracting natural gas or other products, gravel pits and quarries. Test holes, used to determine the availability, quality or depth of groundwater are also exempt provided that all the following conditions are met.

- a. The use of the test hole is limited to the conduct of the test only.
- b. The duration of the test is not more than seven consecutive days.
- c. The test hole is properly closed immediately after the test is completed.

38.3(3) Caveat. Nothing in these rules shall be construed as exempting public water supply wells from the construction permit and water withdrawal permit provisions of part 567, Iowa Administrative Code.

567--38.4(455B) Form of application. Application shall be made on forms supplied by the department. Each application shall list all wells, including abandoned wells, on the applicant's property contiguous to the well site described in the application and shall describe the location of each well site. The location shall be given in the form of a legal land description (section, township and range) to the nearest quarter of a quarter of a section and noted on a map or aerial photograph. The list of wells to be registered shall include but is not limited to abandoned wells, inactive wells, agricultural drainage wells, irrigation wells, domestic wells and livestock wells.

567--38.5(455) Fees.

38.5(1) Fee payment. Each application shall be accompanied by a nonrefundable fee of twenty-five dollars (\$25) in the form of a check or money order payable to the Department of Natural Resources, unless a county board of supervisors or the board's designee is authorized to issue private well construction permits pursuant to rule 38.15(455B). In such cases where the permitting authority is delegated to the county, the county board of supervisors may set a different fee and shall designate the terms for fee payment. More than one proposed well on one contiguous piece of property may be listed on one application and only one fee need be paid irrespective of the number of wells listed on the application form. A proper application shall consist of a fully and properly completed form and nonrefundable fee.

38.5(2) Exemption. The department is exempt from the fee payment requirements of these rules.

567--38.6(455B) Well maintenance and reconstruction. A private well construction permit is not required for the repair, maintenance, rehabilitation or reconstruction of an existing well. Changes in physical dimensions included in these exemptions include, but are not limited to: deepening the well and changing the diameter or length of the casing or the screen. Replacement wells do require a private well construction permit.

567--38.7(455B) Emergency drilling. Each county board of supervisors or the board's designee may grant an emergency permit to a landowner or the landowner's agent if emergency drilling is necessary to meet an immediate need for water. A copy of the permit application and fee shall be sent to the department within thirty days of the granting of the permit by the county board of supervisors or its designee. The emergency permit and application must be signed by the board of supervisors or the board's designee and shall be on forms obtained from the department. In the event the permitting authority has been delegated to the county, no fee need be remitted to the department.

567--38.8(455B) Permit issuance and conditions.

38.8(1) When issued. Upon receipt of a complete application, the department shall issue a permit to the landowner or landowner's agent except as provided in rules 38.7(455B), 38.12(455B) and 38.15(455B).

38.8(2) Not withdrawal permit. Each permit shall include notification that a private well construction permit is not a water withdrawal permit and does not eliminate the necessity of obtaining any water withdrawal permits required in Chapters 51 and 52 of these rules. A water withdrawal permit is required before an applicant can withdraw more than 25,000 gallons of water per day, from any source or combination of sources in the state of Iowa.

38.8(3) Construction by registered well driller. Each well construction permit shall require that each well shall be constructed by a registered well driller in compliance with Chapters 37 and 49 of these rules.

567--38.9(455B) Noncompliance. Violations of any of the provisions of this chapter may be addressed by the department pursuant to Iowa Code sections 455B.109, 455B.175 and 455B.191.

567--38.10(455B) Expiration of a permit. A private well construction permit shall expire one calendar year from the date of issuance. If construction of the proposed well is not started prior to the expiration date, a new

application plus a new nonrefundable fee must be filed with the department or the county board of supervisors pursuant to rule 38.15(455B).

567--38.11(455B) Transferability. A private well construction permit is not transferable.

567--38.12(455B) Denial of a permit. The department may deny a private well construction permit if granting the permit would lead to the violation of state law, would result in groundwater contamination, would lead to withdrawal from a protected source; or the director determines that the well would threaten public health or the environment.

567--38.13(455B) Appeal of a permit denial. Any applicant aggrieved by a decision issued under the provisions of this chapter may file a notice of appeal with the director. The notice of appeal must be filed within thirty (30) days of the date of the permit decision. The form of the notice of appeal and appeal procedures are governed by Chapter 7 of these rules.

567--38.14(455B) Effective date. The provisions of this chapter of the rules shall become effective on _____, _____.

567--38.15(455B) Delegation of authority to county board of supervisors.

38.15(1) Application by board. A county board of supervisors requesting the authority to issue private well construction permits shall apply to the department in accordance with Chapter 28E, Code of Iowa. The application shall include statements of agreement to comply with this chapter of the Iowa Administrative Code. Additional information may be requested by the department.

38.15(2) County standards. The county board of supervisors may impose additional standards as local conditions dictate, but cannot be less stringent than those required by the provisions of this chapter.

38.15(3) Information to department. The delegation agreement shall provide for the method, format and frequency of reporting all permit application information to the department.

38.15(4) Board authority. After delegation of authority to a county board of supervisors, all applications in that county shall be made to the board or its designee.

38.15(5) Term of delegation. The delegation of authority shall be for up to five years and may be redelegated at the discretion of the department.

567--38.16(455B) Concurrent authority of the department. Notwithstanding the delegation of permit granting authority pursuant to rule 38.15(455B), the department reserves the right to exercise concurrent authority. In cases where the board or its designee fails to act on an application, or the director determines that a particular application cannot be appropriately evaluated by the board or its designee, the department may review such an application without invoking the provisions of rule 38.17(455B).

567--38.17(455B) Revocation of delegation agreement. The department may revoke the delegation to issue private well construction permits if the board of supervisors or its designee failed or refused to carry out the provisions of this chapter in a timely manner; or violated any of the provisions of the delegation of authority agreement with the department.

Date

Larry J. Wilson, Director

Nancylee Siebenmann stated that, in reference to a county board's designee, someone should be available at all times as that designee because a situation could occur where an emergency drilling need might exist and a person could not find someone to grant the permit.

James Combs stated that designee, in this case, was intended to mean the county health board, but since there is not a county health board in every county it was stated as the board of supervisors or their designee.

Allan Stokes stated that language could be added requesting counties to designate up-front who is going to be the responsible party.

This was an information item; no action was required.

FINAL RULE -- CHAPTER 152. CRITERIA FOR SITING LOW-LEVEL RADIOACTIVE WASTE DISPOSAL FACILITIES

Ruth Bender, Division Administrator, Waste Management Authority Division, presented the following item.

A rule is attached for siting low-level radioactive waste disposal facilities. The proposed rule was submitted for public comment, and hearings were held in Iowa City, Des Moines and Council Bluffs. No public comments were received. One change was made to the original proposal to clarify that the siting criteria document was dated August, 1987. The Chapter 152, "Criteria for Siting Low-Level Radioactive Waste Disposal Facilities" is ready for adoption by the Commission.

ENVIRONMENTAL PROTECTION COMMISSION [567]
Adopted Rule

Pursuant to the authority of the Iowa Code section 455B.485, the Environmental Protection Commission hereby adopts a new 567--Chapter 152, "Criteria for Siting Low-Level Radioactive Waste Disposal Facilities," Iowa Administrative Code.

The Notice of Intended Action for this amendment was published in the Iowa Administrative Bulletin on September 9, 1987 as ARC 7917. Hearings were held in Iowa City, Des Moines and Council Bluffs to receive comments on the proposal. No comments were received.

One correction to the original proposal has been made. The criteria document referenced in section 152.3(3) is the document dated August, 1987. The date "August, 1987" will be added to the rule.

This rule amendment is intended to implement Iowa Code section 455B.485, and will become effective January 20, 1988.

The following amendment is adopted:

Chapter 152
CRITERIA FOR SITING LOW-LEVEL RADIOACTIVE
WASTE DISPOSAL FACILITIES

567--152.1(455B) Authority, purpose and scope.

152.1(1) Authority. This chapter is authorized in the 1986 Iowa Code section 455B.485 paragraph 2, which relates to the siting of low-level radioactive waste disposal facilities.

152.1(2) Purpose. These regulations establish criteria for identifying sites which are suitable for operation of low-level radioactive waste disposal facilities. The waste management authority will apply these criteria to identify and recommend to the commission sites suitable for locating these facilities.

152.1(3) Scope. These regulations apply only to facilities which are owned or operated by the state of Iowa and privately owned or operated facilities which are located upon land owned by the state of Iowa which are used for low-level radioactive waste disposal pursuant to Iowa Code section 455B.485 paragraph 2.

567--152.2(455B) Definitions. In addition to the definitions in Iowa Code section 455B.481, the following definitions apply to this chapter:

"Aquifers" means water-bearing geological formations, group of formations, or part of a formation that is capable of yielding significant amounts of groundwater for beneficial use.

"Conservation area" means any park, recreation area, wildlife area, forest, prairie, preserve, natural area, scenic area owned, managed, or under control of any government agency or organized conservation group on or before the date of enactment of these rules.

"Criterion" means a test, rule, measure, or model by which judgment will be made.

"Critical wildlife habitat" means any areas known to be inhabited on a seasonal or permanent basis by, or to be critical at any stage of the life cycle of any wildlife or vegetation identified as "rare," "threatened," or "endangered" by official federal or state lists of species, or is under active consideration for listing.

"Cultural area" means any known property of recognized archaeological, architectural, cultural or historical significance as listed in or eligible for the National Register of Historic Places, the significant State Site records of the Office of Historic Preservation, the Office of the State Archaeologist, or is under active consideration for listing. Archaeological property shall include, but is not limited to, ancient mortuary sites.

"Dam hazard area" means any area identified as areas of dynamic flooding below a dam (the inundation zone) or areas of static flooding above a dam (flood pool). The inundation zone includes the area that would be flooded by a flood wave generated by dam failure during a one hundred (100)-year flood. The static flooding zone is equal to the pool level reached during a one hundred (100)-year inflow flood, or the top of the dam, whichever is greater.

"Drinking water source" means the groundwater or surface water intake of drinking water used for human consumption.

"Facility" means any hazardous waste management facility including land and structures, appurtenances, improvement and equipment for handling, treatment, storage or disposal of hazardous wastes.

"Floodplain" means the land adjacent to a stream which has been or may be inundated by a flood having the magnitude of the regional one hundred (100)-year flood.

"Geological hazard structures" means any faults, fracture zones, or other structures that may provide pathways to groundwater.

"Karst areas" means a type of topography or surface area covered by alluvial or colluvial sediments that may form over limestone, dolomite, or gypsum formations by dissolving or solutions, and that are characterized by closed depressions or sinkholes, caves, and underground drainage.

"Mineral and energy resources" means minerals, construction materials, metals, coal, gas, and oil.

"Mining activity" means any area of past or present underground or surface mining, mineral extraction, or major exploration or production drilling for oil, gas, or mineral resources, and any area likely to be influenced by mining activity through subsidence or surface deformation.

"Nonattainment area" means any area not attaining the National Ambient Air Quality Standards as defined in Part D of the Clean Air Act.

"Population area" means any commercial, school, church, social, medical facility, elderly housing, correctional facility, mobile home park, or incorporated residential area.

"Prevention of significant deterioration" is defined in Part C of the Clean Air Act.

"Prime farmland" means any area identified as such by the United States Department of Agriculture, Soil Conservation Service.

"Protected basins" means any portion of the drainage basin of protected water areas within two (2) miles of the water area. Protected water areas are those classified as such pursuant to Iowa Code chapter 108A, or high-quality waters, high-quality resource waters or Class "C" waters designated in Chapter 61 of the department's rules.

"Proximity to major generators" means within fifty (50) miles of the central point of generation based on the latest available RCRA biennial report on hazardous waste generation in Iowa.

"Seismic risk" means the relative geologic stability of the site based on the likelihood of structural damage due to seismic events. Seismic risk categories, as developed by the National Oceanographic and Atmospheric Administration, will be used to rate relative stability.

"Site" means the land area upon which a facility is, or is proposed to be, physically located, including but not limited to adjacent land use for utility systems such as repair, storage, processing, or other areas incident to the facility or operation.

"Siting authority" means the party with the specific authority to select sites for facilities.

"Transportation routes" means any public all-weather hard-surfaced road with adequate capacity to carry the type and volume of commercial vehicular traffic serving the facility for the entire year with no embargoes, special permits or other restrictions on roads, overpasses or bridges that would prevent transportation to the facility.

"Utilities and services" means electricity, gas, water and sewer utilities, and police, fire protection, and emergency medical services.

"Wetlands" means any area inundated by surface or groundwater with a frequency sufficient to support, under normal circumstances, a prevalence of vegetation or wildlife requiring saturated or seasonally saturated soil conditions for growth or reproduction. These areas include swamps, marshes, bogs, sloughs, wet meadows, mudflats, sandflats, ponds, lakes, and similar areas.

567--152.3(455B) Siting criteria. The siting authority shall use the following criteria in selecting sites for facilities.

- 151.3(1) Exclusionary criteria. No facility shall be sited within:
- a. An area of seismic risk category of four (4) or greater;
 - b. A one hundred (100)-year floodplain;
 - c. A dam hazard area;
 - d. An area with less than one hundred (100) feet of aquitard between the base of operation and the subjacent aquifer;
 - e. One (1) mile of a geologic hazard structure;
 - f. One (1) mile of a karst area;
 - g. One (1) mile of an area of past or present surface or underground mining activity;
 - h. One (1) mile of wetland;
 - i. Any protected basin; or
 - j. Ten (10) miles of any nuclear power plant.

152.3(2) Quantitative criteria. The quantitative criteria and corresponding values which are to be applied are in Table 1 as follows:

Table 1

	Value Assigned		
	<u>5 points</u>	<u>2 points</u>	<u>Excluded</u>
Mineral and Energy Resources	No significance present within one mile	Significant presence with perpetual ban on recovery	---
Drinking Water Sources	No sources within one mile	Source permanently closed and alternative water source provided	---
Critical Wildlife Habitats	No habitat within one mile	Permanent buffer and no interference	Interference
Conservation Areas	No area within one mile	Permanent buffer and no interference	Interference
Cultural Areas	No area within one mile	Permanent buffer and no interference	Interference
Population Areas	No area within one mile	Permanent buffer and no interference	Interference
Prime Farmland	Less than 25% prime farmland	More than 25% prime farmland	---
Nonattainment With NAAQS	No significant impact predicted	Little significant impact predicted	---
Prevention of Significant Deterioration	Good data available and sufficient increments	Little data available but increment available	---
Transportation Routes	Within 5 miles of major highway, 10 miles of a	Beyond 5 miles from major highway, 10 miles of a	---

	rail line, and 50 miles interstate highway	rail line, or 50 miles from interstate highway	
Proximity to Major Generators	Within 50 miles major generators	Beyond 50 miles from generators	---
Utilities and Services	Accessible services available	Sites needing services extended	---

152.3(3) Methodology. The methodology to be used by the siting authority in applying these criteria is contained in the report "Hazardous Waste Management Facility Siting Criteria and Methodology, August, 1987" which is adopted by reference. The criteria listed in this rule shall be applied in three steps as follows:

- a. Step 1. The exclusionary criteria shall be applied to the entire state. Step 2 shall be applied to those areas remaining.
- b. Step 2. The quantitative criteria shall be applied to the nonexcluded areas identified in step 1. The values in table 1 shall be applied and the potential sites ranked in order of priority.
- c. Step 3. The top rated potential sites shall be subject to detailed evaluation. The best site for the facility shall be selected.

Date

Larry J. Wilson, Director

Motion was made by Catherine Dunn to approve Final Rule--Chapter 152, Criteria for Siting Low-Level Radioactive Waste Disposal Facilities. Seconded by Nancy Lee Siebenmann. Motion carried unanimously.

MEMORANDUM OF AGREEMENT--UNIVERSITY OF NORTHERN IOWA

Ruth Bender, Division Administrator, Waste Management Authority Division, presented the following item.

The Commission is requested to approve the memorandum of agreement between the Department of Natural Resources and the University of Northern Iowa to develop a comprehensive plan for the establishment of a small business assistance center for the management of solid and hazardous substances.

Senate File 396 directed the Waste Management Authority Division of the Department of Natural Resources to develop a comprehensive plan for the establishment of a small business assistance center. House File 631 specifically identified the University of Northern Iowa as the site for the center and appropriated \$50,000 from the Groundwater Fund for the University for implementation. It was determined that a cooperative effort between the Department and the University was the most efficient approach to the preparation of the plan.

Motion was made by Catherine Dunn to approve the Memorandum of Agreement with the University of Northern Iowa to develop a comprehensive plan for the establishment of a small business assistance center for the management of solid and hazardous substances. Seconded by Gary Priebe. Motion carried unanimously.

APPOINTMENT--TOM HESTON (ANKENY)

Chairman Schlutz requested the 2:00 p.m. appointment with Tom Heston of Ankeny be taken up at this time.

Mr. Heston was not present to speak.

EMERGENCY RULE ADOPTION--CHAPTER 144, HOUSEHOLD HAZARDOUS MATERIAL

Ruth Bander, Division Administrator, Waste Management Authority Division, presented the following item.

The attached rules are intended to implement Part Five of the Groundwater Protection Act concerning household hazardous materials. It is being recommended that the rules be emergency adopted in conjunction with the usual effective date of January 20, 1988.

The rules provide a new Chapter 144 of the Commission's rules and identify the display area labeling and consumer information requirements for retailers of household hazardous products.

November 2, 1987 DRAFT

Chapter 144
Household Hazardous Materials

567--144.1(455F) Scope. This chapter is intended to implement provisions of Iowa Code Chapter 455F. The Act requires retailers that sell household hazardous materials to affix display area labels in a prominent location on or near the display area of a household hazardous material.

The Act requires retailers to maintain and prominently display consumer information booklets which provide information on the proper use of household hazardous materials, and specific instructions for the proper disposal of certain substance categories. Additionally, retailers are required to make available consumer information bulletins about household hazardous materials. Manufacturers or distributors of household hazardous materials, who authorize independent contractor retailers to sell products of the manufacturer or distributor on a person-to-person basis, are required to provide each independent contractor retailer with sufficient quantities of the booklet. The independent contractor retailer is to provide a copy of the booklet to the customer at the time of the sale.

The Act requires the environmental protection commission to adopt rules which establish a uniform display area label to be used by retailers. The environmental protection commission also must adopt rules which designate the type and amount of information to be included in the consumer information booklets and bulletins. The booklets, bulletins and labels are available free from DNR, but the rules allow the retailers to provide their own.

This chapter contains rules identifying products which are considered to be household hazardous products, the minimum size, color and content of labels which identify products, the placement of display area labels and informational signs as well as prescribing the general information to be included in consumer information booklets.

567--144.2(455F) Definitions.

"Commission" means the state environmental protection commission.

"Department" means the department of natural resources.

"Display area label" means the signage used by a retailer to mark a household hazardous material display area as prescribed by the department.

"Informational signs" means signs which explain the household hazardous materials program, the significance of the display area labels and direct consumers to the location of informational booklets or other information available in the store.

"Manufacturer" means a person who manufactures or produces a household hazardous material for resale in this state.

"Retailer" means a person offering for sale or selling a household hazardous material to the ultimate consumer, within the state.

"Wholesaler" or "distributor" means a person other than a manufacturer or manufacturer's agent who engages in the business of selling or distributing a household hazardous material within the state, for the purpose of resale.

567--144.3(455F) Household hazardous materials.

144.3(1) Any brand, grade, size or volume of the following products constitute household hazardous materials:

- (a) motor oils and motor oil additives,
- (b) motor oil filters,
- (c) gasoline additives,
- (d) diesel fuel additives,
- (e) degreasers,
- (f) waxes and polishes (excluding nail polish),
- (g) solvents (excluding water),
- (h) paints (excluding latex-based paints),
- (i) lacquers,
- (j) thinners (excluding water),
- (k) caustic household cleaners
- (l) spot and stain removers with a petroleum base,
- (m) petroleum-based fertilizers,

144.3(2) Exemptions. A household hazardous material does not include laundry detergents or soaps, dishwashing compounds, chlorine bleach, personal care products, personal care soaps, cosmetics, animal and human medications, and pharmaceuticals.

567--144.4(455F) Labeling and sign requirements.

144.4(1) Specifications.

(a) The display area label shall be at least 7/8" x 7/8" in size and shall be printed with the household hazardous materials program symbol in black on a fluorescent yellow background as shown below.



(b) Informational signs shall be at least 8-1/2" x 11" and must contain a copy of the symbol of at least 5" in size. The sign shall explain the significance of the shelf label, the relationship of improper disposal of household hazardous materials to the contamination of groundwater, and direct consumers to the location of informational materials in the store.

144.4(2) General requirements. Retailers required to be permitted under 455F.7 shall affix display area labels meeting the specifications of 144.4(1)a immediately adjacent to the price information at the location where the household hazardous material is displayed for sale in their retail outlet. Where products are individually price marked with no corresponding shelf pricing information, the labels shall be affixed immediately in front of, above or below the product displays. All labels must be in locations where they can easily be seen by consumers. Where the same product from the same manufacturer is offered in a variety of sizes or colors on a single shelf, the display area labels may be spaced up to two feet apart on the shelf; or if the shelf is four feet or less in length, a single label on each shelf is acceptable if an informational sign is placed above the display rack.

Retailers are not required to label shelves which are in an enclosed area that is not accessible to the consumer, but the retailer must provide copies of the informational booklets and maintain a list of products sold which are household hazardous materials adjacent to an informational sign. These materials must be at the location where the consumer picks up the products for purchase.

144.4(4) Availability. Retailers are responsible for assuring that labels and signs are all located properly in accordance with the provisions of 144.4(2) and 144.4(3). Retailers may print their own display area labels so long as they are identical to those provided by the department. Retailers may print their own informational signs so long as they are at least the same size and contain all of the information found on those provided by the department. Retailers may also obtain labels and signs from the department. Order forms for these materials are available on request from the department.

144.4(5) Variances. Retailers wishing to use labels or signs other than as required by this chapter must request and receive from the department a variance from these rules, provided however that a variance is not required to use a label which is larger in overall dimensions, or informational signs which are larger than those required by this chapter.

567--144.5(455F) Consumer information material.

144.5(1) Required. All retailers, wholesalers or distributors required to be permitted under 455F.7 shall display the consumer information material described in 144.5(2) and provide it to the public on request. Manufacturers or distributors of household hazardous materials who authorize independent contract retailers to sell products on a person-to-person basis are required to provide each independent contractor with sufficient quantities of the materials described in 144.5(2), as well as a list of household hazardous materials offered for sale, to be disseminated to their customers. During the course of a sale of household hazardous material by a contractor retailer, the customer shall in the first instance be provided with a copy of both the list and the consumer information booklet. In subsequent sales to the same customer, the list and booklet shall be noted as being available if desired. All materials shall be made available to customers at no charge.

144.5(2) Contents. Consumer information booklets available from the department shall contain at a minimum the following types of information:

Information on the kinds of products considered to be household hazardous materials, options for use and the proper disposal of household hazardous products, emergency phone numbers in case of a spill, and an explanation of the groundwater concerns related to the household hazardous materials program. Retailers may print their own information booklets so long as the text of the booklets is identical to that provided by the department. The booklets may contain original graphics and the identity of the retailer as a means to customize the booklet, except that the household hazardous materials program symbol must be printed on the cover page of any booklets published after the effective date of these rules. The booklet provided by the department will be subject to periodic updates as the program develops, and may include space for the retailer to include their own name or logo.

144.5(3) Bulletins. Periodically, the department may provide bulletins or other forms of public information materials for distribution to enhance public understanding of the program and their participation in it. The bulletins may also cover special areas of concern, new developments on disposal or product option.

144.5(4) Availability. Retailers permitted under 455F.7 may obtain consumer information materials for distribution to their customers by filling out an order form. Order forms and booklets are available at no charge upon request to the department.

Date

Larry J. Wilson, Director

Mrs. Bender pointed out that these rules will be emergency adopted, but will not be emergency implemented; the rule will become effective January 20, 1988.

Motion was made by Charlotte Mohr to approve Emergency Adopted Rule-- Chapter 144, Household Hazardous Materials. Seconded by Catherine Dunn. Motion carried unanimously.

REFERRALS TO THE ATTORNEY GENERAL'S OFFICE (Continued)

City of Ankeny

Mike Murphy briefed the Commission on the history of this case.

Chairman Schlutz invited anyone from the City of Ankeny to speak; no one requested to speak.

Motion was made by Catherine Dunn for referral to the Attorney General's Office. Seconded by Donna Hammitt. Motion carried unanimously.

BREMER COUNTY CONTESTED CASE--PROCEDURAL MOTION

James Combs, Division Administrator, Coordination and Information Division, presented the following item.

Bremer County has appealed the department's denial of a permit to install a Patherm Pit Burner at their sanitary landfill. That matter has been referred to the hearing officer for normal contested case procedures. On October 26, 1987, the county requested that this matter be presented directly to the Commission rather than a hearing officer. The parties will be at the Commission meeting to present their respective positions on this procedural issue, and the Commission is asked to decide whether it will hear the case directly or whether it should be heard by a hearing officer in the first instance.

Mr. Combs explained that the Commission can decide whether or not they want to hear the appeal themselves. If the Commission chooses to hear the appeal, it must be decided whether or not it should be heard today, or at another time.

Catherine Dunn commented that when the Commission has the advantage of the hearing officer's report, they have something to use in making a decision.

Nancylee Siebenmann expressed concerns about setting a precedent of waiving a hearing with the hearing officer and coming directly to the Commission. She feels that the Commission should stick to the procedures at hand unless there is a pressing reason to do otherwise.

APPOINTMENT -- BREMER COUNTY

Ralph Juhl, Chairman of the Bremer County Board of Supervisors, stated that the reason they were seeking quick action was that it would expedite putting their plant in operation.

Motion was made by Nancylee Siebenmann to refer the case to a hearing officer and ask that it be expedited as quickly as possible. Seconded by Catherine Dunn. Motion carried unanimously.

PROPOSED CONTESTED CASE DECISION -- DENNIS GREINER

James Combs, Division Administrator, Coordination and Information Division, presented the following item.

On February 16, 1987, the Department issued Administrative Order No. 87-FP-02 requiring Dennis Greiner and others to submit certified engineering plans regarding an unauthorized channel change on West Fork Crooked Creek in Washington County. Only Mr. Greiner pursued an appeal, and the hearing was conducted on June 30, 1987. Administrative Hearing Officer Amy Christensen Couch has rendered the attached proposed decision.

Mr. Greiner may appeal this proposed decision to the Commission if he chooses. In the absence of an appeal, the Commission may decide on its own motion to review the proposed decision. If there is no appeal or review of the proposed decision, it automatically becomes the final decision of the Commission.

The Commission did not request to review this matter; this has the effect of upholding the hearing officer's decision.

REFERRALS TO ATTORNEY GENERAL'S OFFICE (Continued)

JTH Industries/Delzer Leaser

James Combs briefed the Commission on the history of this case.

Motion was made by Clark Yeager for referral to the Attorney General's Office. Seconded by Catherine Dunn. Motion carried unanimously.

Big Rock Tap

James Combs briefed the Commission on the history of this case.

Motion was made by Nancy Lee Siebenmann for referral to the Attorney General's Office. Seconded by Catherine Dunn. Motion carried unanimously.

City of Washington

James Combs briefed the Commission on the history of this case.

Motion was made by Catherine Dunn for referral to the Attorney General's Office. Seconded by Clark Yeager. Motion carried unanimously.

Finlan Landfill

James Combs briefed the Commission on the history of this case.

Motion was made by Catherine Dunn for referral to the Attorney General's Office. Seconded by Donna Hammitt. Motion carried unanimously.

Chairman Schlutz informed the Commission that, at the October meeting, the referral for the City of Ankeny was tabled and the Commission would now need to vote to remove the matter from the table, and then vote again on the referral.

Motion was made by Charlotte Mohr to remove the City of Ankeny referral from the table. Seconded by Catherine Dunn. Motion carried unanimously.

Motion was made by Catherine Dunn for referral of the City of Ankeny to the Attorney General's Office. Seconded by Clark Yeager. Motion carried unanimously.

DISCUSSION OF LEHIGH CLAY PRODUCTS, INC. LETTER

Gary Priebe stated that he feels that staff should study this situation, acquaint themselves with it, and bring it back before the Commission next month.

Allan Stokes stated that he had not seen the Lehigh letter until moments ago. Mr. Stokes stated that Lehigh Clay Products had purchased the site from Dickey Clay Projects, and prior to making the purchase, they asked our field office to do an environmental assessment. He added that the department does not do environmental assessments; staff recommends that they hire a consultant for an assessment for prospective purchases of land. Staff did go out and look it

over and, at that time, discovered a sheen on Crooked Creek. The sheen was the result of a diesel fuel spill that took place in the mid-70s when the other company owned it. Soil samples were taken in January, 1987 which indicated contaminated soils. Lehigh was then informed that they would have to clean up the site. They needed to hire a contractor, do a site characterization, identify the extent of the contamination, identify the extent of impacted water supplies, and design a proposed remediation plan. Lehigh contacted Hickok and Associates, who developed a plan for cut-off walls to keep the water from going to the river. The plan included observation wells around the perimeter of the site. Staff told Lehigh that the plan was not acceptable as the department wanted some sort of site characterization wells placed in the site to determine the degree of contamination where the spill actually took place. Also, Lehigh's plan did not include a commitment to do any clean-up.

It will be put on the agenda for the December meeting.

Keith Uhl stated that the issue is more than clean-up costs. He added that, if anything, staff was too cooperative. Mr. Uhl stated that the letter from Lehigh implies that the department has a duty to go and inspect potential land purchases by individuals and to inform them whether or not the prospective property is environmentally sound. He further stated that if people want to buy property, they have to dip into their pocket, not the state's, to see if there are problems.

ADDRESS ITEMS FOR NEXT MEETING

Radon report (Health Department)
Procedure used--complaints received in field offices
Processing of low-level radioactive waste and land application for fertilizer
Floodplain mapping
GRA-Iron discussion
Report on Lehigh

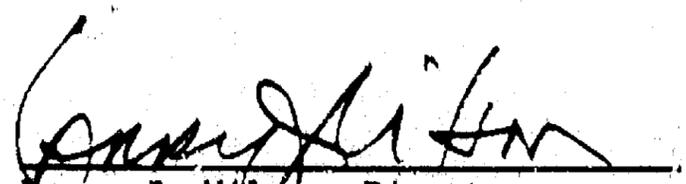
NEXT MEETING DATES

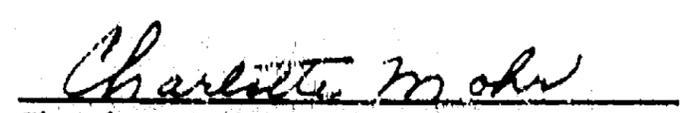
December 14-15, 1987
January 19, 1988
February 15-16, 1988

ADJOURNMENT

Motion was made by Catherine Dunn to adjourn. Seconded by Charlotte Mohr.
Motion carried unanimously.

With no further business to come before the Environmental Protection
Commission, Chairman Schlutz adjourned the meeting at 3:30 p.m., Tuesday,
November 17, 1987.


Larry J. Wilson, Director


Charlotte Mohr, Secretary

(11-87.MIN/sc)

ADM-1-1-1
November 1987

MEETING AGENDA
ENVIRONMENTAL PROTECTION COMMISSION
WALLACE STATE OFFICE BUILDING
Tuesday, November 17, 1987

Meeting Convenes at 8:30 a.m., fourth floor conference room

Break	10:00 a.m.
Public Participation	10:30 a.m.
Appointments:	
I.B.P.	1:00 p.m.
Tom Hoston - Hocking	2:00 p.m.
Bremer County	2:30 p.m.
Break	3:00 p.m.

1. Approval of Agenda.
2. Approval of Minutes of October 19-20, 1987.
3. Director's Report. (Wilson) Informational.
4. Approval of FY-89 Budget Request. (Kuhn) Decision.
5. Office Lease--Regional Office #2 (Mason City). (Kuhn) Decision.
6. Annual Computer Usage Agreements with U.S. Environmental Protection Agency. (Kuhn) Decision.
7. Monthly Reports. (Stokes) Informational.
8. Metro East Sanitary Landfill Report. (Stokes) Informational.
9. Surcharges and Sanitary Landfills. (Stokes) Informational.
10. GRA-Iron Foundry. (Stokes) Informational.
11. Pesticides in Water Supplies Using Surface Water Sources. (Stokes) Informational.
12. Notice of Intended Action--Chapter 102, Permits (Sewage Sludge Disposal at Sanitary Landfills). (Stokes) Decision.
13. Proposed Rule--Chapter 38, Private Water Well Construction Permits Authorized Under 455B.187. (Stokes) Informational.
14. Final Rule--Chapter 152, Criteria for Siting Low-Level Radioactive Waste Disposal Facilities. (Bender) Decision.
15. Emergency Adopted Rule--Chapter 144, Household Hazardous Materials. (Combs) Decision.
- 15A. Memorandum from [unclear] to [unclear] U N I

Page 2

16. Proposed Contested Case Decision -- Dennis Greiner. (Combs) Informational.
17. Bremer County Contested Case - Procedural Motion. (Combs) Decision.
18. Referrals to Attorney General's Office. (Combs) Decision.
19. Address Items for Next Meeting.
20. *Discussion of LaHigh Clay Products, Inc. letter*

NEXT MEETING DATES

December 14-15, 1987

January 18-19, 1988

February 15-16, 1988

ENVIRONMENTAL PROTECTION COMMISSION

NAME

COMPANY OR AGENCY

CITY

(Please print)

DONALD A. TORNEY	Iowa Co Engr Assoc	Manage, Ia.
MARJORIE DENWISON	Cedar Rapids Gazette	K. M. Bureau
Theresa Kelsoe	St. Sen. Demg Caucus	Des Moines
Robert Anderson	Iowa Wildlife Fed.	Des Moines
Bill Wynn	City of Des Moines	Des Moines
Rich Jackson	IBP, Inc	Dakota City, NE
Jim Langford		Dow City, Iowa
Ralph W. Juhl	Bremner County	Waukegan, Ia
TODD FUNKERT	BREMER COUNTY	WAUKEGAN, IA.
Curkela	" "	" "

ENVIRONMENTAL PROTECTION COMMISSION

Item 4

Decision

Approval of DNR FY89 Budget Request

Approval of the attached staff recommendations regarding the DNR's budget submission to the Governor and the 1988 General Assembly is requested as required by section 455B.105(4).

This summary and the attachments present the DNR's budget request. Major issues as compared to the current level of agency operations and funding include the following:

- *Salary supplemental appropriations and adjustments.
- *Implementation of the Groundwater program.
- *Adequate funding of the 5% sewage works grants.
- *Capitalization of the sewage works revolving loan program.
- *Adequate maintenance and staffing of state parks, forests, and recreation areas.
- *Funding for major capital acquisition and development initiatives.
- *State support for multi-state associations.

The primary focus of the budget request process relates to the agency's request from the General fund. Following is a table presenting the staff recommendation for General fund appropriations as compared to FY87 and FY88.

Description	Actual FY87	Budget FY88	Request FY89
Operations-regular	\$ 9,644,596	\$10,529,892	\$12,337,825
Operations-Salary Suppl.	-----	437,013	-----
U.S.G.S. Coop. Program	185,558	185,983	185,983
Green Thumb Program	138,730	199,800	199,800
5% Sewage Works Grants	1,865,694	1,276,730	2,354,000
5%-Supplemental	-----	493,000	-----
Sewage Works Loan Fund	-----	-----	3,285,120
Low-Level Radioactive Waste Compact	45,000	-----	78,000
Low-Level Supplemental	-----	60,600	-----
Miss. Basin Assoc.	-----	-----	35,000
Miss. Basin Assoc. Suppl.	-----	35,000	-----
General fund Capital Acquisition and Development	-----	39,960	2,679,000
General fund Capital, Suppl.	-----	250,000	-----
Total General Fund	\$11,879,578	\$13,070,965	\$21,172,728

DNR programs are also financed with a wide array of federal funds, dedicated revenues, and other special sources outside of the State General fund. These are displayed as part of the recapitulation relating to general department operations, and as those sources relate to special programs.

Staffing. Staffing levels are presented as part of each division's financial schedule in terms of Full Time Equivalents (FTE's). The actual FTE for FY87 (the fiscal year just completed) was 855.55 This was considerably less than the budgeted FTE's, 937, due to General fund budget shortfalls, and normal vacancies funded by other sources.

Thus, the estimated FY88 FTE level of 973.1 appears to be significantly higher than the FY88 actual. This is due to two factors. First, the FY88 figure assumes all budgeted positions are filled for the whole fiscal year. Just normal turnover and attrition will reduce that figure by approximately 2%. Secondly, an estimated 43 new and additional positions will be added relating to the Groundwater program and the Waste Management Authority division.

In addition to the Groundwater positions, Parks is requesting an increase of approximately ten FTE's in seasonal positions for improved park maintenance and visitors services, and two full time park attendants. The Environmental Protection Division is requesting the addition of five new positions in the Floodplains and Dams work unit to cope with existing workload. Geology is requesting two additional FTE's and the Coordination and Information division is requesting an additional planner.

The budget detail is presented in the attached material as follows:

1. A detailed explanation of the supplemental appropriations requests.
2. A recapitulation of department operations, and a separate analysis for each division. This analysis includes an FTE and expenditure schedule comparing the FY87 actual to the FY88 budget and the FY89 request. Additionally, a schedule is presented for each division showing the 75% base (75% of the FY87 budget, except for federal and grant funds) and decision packages ranked from highest (#1) to lowest. In theory, the "base" and the "decision packages" form a priority array of budget decisions for each division.
3. A summary and narrative explaining the 5% sewage works grant request and priorities.
4. An explanation of the request to capitalize the Sewage Works Revolving Loan program.
5. A summary of the various capital acquisition and development programs, by funding source, and schedules of individual projects. (These budgets were approved by the Natural Resources Commission at their October meeting.)
6. A summary of the requests for assessments relating to the Low-Level Radioactive Waste Compact and the Mississippi River Basin Commission.

7. The Grov' water budget by "account" as appropriated by the General Assembly. (This was presented to the Environmental Protection Commission at the September meeting.)

Approval of the budget recommendation as presented is respectfully requested.

TABLE OF CONTENTS

Supplemental Appropriations.....	1-1
Department Operations Narrative.....	2-1 to 2-4
Department Operations, Financial Summary.....	2-5
Director's Office.....	2-6
Coordination and Information Division.....	2-7 to 2-8
Administrative Services Division.....	2-9 to 2-10
Parks, Recreation, and Preserves Division..	2-11 to 2-13
Forests and Forestry Division.....	2-14 to 2-15
Energy and Geological Resources Division..	2-16 to 2-17
Environmental Protection Division.....	2-18 to 2-19
Fish and Wildlife Division.....	2-20 to 2-21
Waste Management Authority Division.....	2-22
USGS Coop. and Green Thumb Programs.....	2-23
5% Sewage Works Grants.....	3-1
Local Sewage Works Revolving Fund.....	4-1
Capital Acquisition and Development Narrative.	5-1 to 5-2
Fish and Wildlife Capitals, FY88.....	5-3 to 5-4
Fish and Wildlife Capitals, FY89.....	5-5 to 5-6
Marine Fuel Tax Recap.....	5-7
Marine Fuel Tax Capitals, FY88.....	5-8
Marine Fuel Tax Capitals, FY89.....	5-9
Park User Fee Fund Recap.....	5-10
Park User Fee Fund Capitals, FY88.....	5-11
Park User Fee Fund Capitals, FY89.....	5-12
Iowa Plan (Lottery) Projects.....	5-13 to 5-14
General Fund Capitals.....	5-15
Association Assessments.....	6-1
Groundwater Budget Narrative.....	7-1
Agricultural Management Account.....	7-2 to 7-3
Household Hazardous Waste Account.....	7-4
Oil Overcharge Account, Groundwater.....	7-5 to 7-6
Storage Tank Management Account.....	7-7
Solid Waste Account.....	7-8

SUPPLEMENTAL APPROPRIATIONS

1. Salary Supplementals

State Police Officers' Council (SPOC) wage settlements and comparable worth adjustments for FY88 and for the FY89 budget request were not projected correctly in the official salary projections provided by the DOM. Therefore, it is necessary to request supplemental salary adjustments to provide for pay adjustments already approved and implemented.

A \$586,057 adjustment is needed from Fish and Wildlife fund. This can be done administratively under DOM authority. This can be offset to a limited degree by \$200,000 available from other budget categories in the Fish and Wildlife Division budget. Thus, a net adjustment of \$386,057 is needed.

A \$437,013 adjustment is needed from the General fund. This relates primarily to Parks, Forestry, and Geology. The alternative is to reduce staffing significantly in these areas. To a lesser degree, other areas funded in part by General funds are also affected.

2. Low-Level Radioactive Waste Compact Assessment.

A \$60,600 appropriation from the General fund needed to pay the FY88 membership assessment.

3. Union Grove Lake Restoration.

\$250,000 is needed to complete all work contemplated at Union Grove lake. The current appropriation of \$250,000 is sufficient to cover only about one half of the remaining work, primarily dredging. Letting a contract this winter with the currently available funding will accomplish only part of the remaining work and require a contract amendment or an additional contract at a later date. With additional funding, a complete contract can be let this winter, resulting in a lower overall cost to the state.

4. Mississippi River Basin Association Assessment.

A \$35,000 appropriation from the General fund is needed if Iowa is to retain a full voice along with other states and the federal government regarding basin issues.

5. 5% Sewage Works Grants.

\$493,000 is needed to repay monies "borrowed" from earlier 5% appropriations from the General fund for AIDEX cleanup costs. (See also item regarding the entire 5% Sewage Works Grants program.)

DEPARTMENT OPERATIONS

1. Director's Office.

This budget unit includes the resources and expenditures for (1) operation of the Director's office, Deputy Director, and secretarial staff; per diem and expenses for the Environmental Protection Commission; and per diem and expenses for the Natural Resources Commission. No significant changes or additions to the current level of operations are requested for FY89.

2. Coordination and Information Division.

This division handles the Information and Education programs, planning and coordination activities with other governmental entities, and DNR legal services in conjunction with the Attorney General's office.

All current level activities are ranked as higher priorities than requested program expansions.

Two staff positions were added in FY88 relating to groundwater tasks. These include a training officer for curriculum development and a legal clerk to enhance productivity of the legal staff. These positions are continued in the FY89 request.

In addition to the current level, decision packages are requested for improving planning capabilities, improving magazine circulation and TV public service announcements, Conservation Education Center equipment replacement and maintenance, and improving staff productivity with personal computers.

3. Administrative Services Division.

This division provides support services in the traditional areas; Finance, Budget & Grants, Data Processing, and Office Services and Support.

In addition, this division also includes a Construction Services bureau for designing and contracting capital improvements and a Land Acquisition and Management bureau for acquiring land and coordinating land management. This division also includes "cost pools" for the central office vehicle pool, all general agency postage expense, central office supplies and central office communications.

The FY88 budget and the FY89 request includes nine additional positions necessary to provide administrative services and support to the Groundwater program additions in other divisions, and the Waste Management Authority division. These positions are funded by indirect charges to groundwater related funds.

In addition to the current level of operations, funds are requested for the lease of a Computer Aided Design (CAD) system for the Construction Services bureau, and routine replacement of of-

office equipment and furniture. Routine replacement has been delayed for several years due to budget cutbacks.

4. Parks, Recreation and Preserves Division.

This division is responsible for Iowa's State Parks, State Recreation areas, State Preserves in cooperation with the State Advisory for Preserves, and the Natural Areas Inventory and surveys. This division is funded with General funds, camping and miscellaneous revenues, and Marine Fuel Tax.

The budget request for FY89 seeks to restore funding for routine park and recreation area maintenance and equipment replacement. For approximately the past six years, facility maintenance and equipment replacement have been deferred in response to budget shortfalls.

As compared to the current staffing levels, the budget requests that seasonal staffing be restored to previously budgeted levels, and that two additional full time positions be added, one each at George Wyth park and Nine Eagles park. Utilities need to be increased to handle new and expanded park facilities constructed during the past two years.

The State Advisory for Preserves has also requested a higher level of funding for State Preserve maintenance, and for scientific studies related to state preserves.

5. Forests and Forestry Division.

This division provides technical forestry services to landowners and the timber industry, maintains state forests, and operates the State Forest Nursery. It is funded through the General fund, timber sales, and nursery stock sales.

No significant funding is requested above the current level of operations. Funds are requested for equipment replacement, as expenditures in this area have been deferred for a number of years due to budget shortfalls.

The Natural Resources commission has increased nursery stock prices as per the legislative mandate. Nursery income is projected to increase from approximately \$300,000 in FY87 to \$360,000 in FY88 and beyond.

6. Energy and Geological Resources Division.

The Energy bureau, within this division, is supported by oil overcharge funds, utility refunds, and other earmarked sources. The Geology Bureau is funded by the General fund, federal aid, and Groundwater revenues. Thus, all of the decision packages are related to the Geology bureau.

Four geology positions were switched from federal funding to a combination of federal and groundwater funding in FY88 and in the FY89 request. Three new geology positions, funded with

groundwater funds, were added in the FY88 budget and the FY89 request.

Except for groundwater related activities, no program expansion above the current level of operations is requested.

The Geology bureau receives a separate general fund appropriation for a cooperative program with the U.S.G.S. for research drilling, stream gauging, and topographical map preparation. No change from the current level is requested in this program.

7. Environmental Protection Division.

This division is funded by the General fund, Groundwater revenues, and federal aid. The decision packages related to the division reflect programs funded mostly by the General fund. Activities funded primarily by federal funds and/or Groundwater revenues are given the highest priority with the "base" budget.

The FY88 budget and the FY89 request reflect 36.25 positions funded with Groundwater related revenues. Twenty-four of these are new positions, and the remainder are existing positions, previously funded with state and/or federal funds.

In addition to the current level of operations as described above, the division is making two significant requests relating to operations.

The University of Iowa Hygienic Laboratory (UHL) performs a number of scientific and analytic services under contract to the DNR. This has largely been financed through federal programs. The DNR and the UHL are currently negotiating over the contract for FFY88. They have requested that general university overhead be added to the cost of providing services. This issue has not yet been settled. However, as a consequence, the DNR has included a decision package requesting \$200,000 from the General fund to cover this contingency, as federal funds are not available to finance the UHL's request.

A decision package is also requested to add five staff positions and support for floodplain services. This level of staffing would provide for the annual inspection of high hazard dams; provide for the inspection of all dams at least every two years; provide for more field inspections to monitor floodplain activities; handle permit requests relating to floodplain and dam construction more quickly; and provide for mapping the floodplains of all rivers of the state within the next three years.

8. Fish and Wildlife Division.

This division is funded completely with license revenues, some miscellaneous revenues, and related federal aid. No increases over the current level of operations is requested.

9. Waste Management Authority Division.

This division was created by S.F. 396 passed by the 1987 G.A. Division operations are funded completely with Groundwater related revenues in FY88 and FY89. The mission of this division is to encourage and promote the proper and safe management of solid, toxic, hazardous and low-level radioactive wastes generated in Iowa through cooperation with other public and private agencies or operation of such state owned facilities as may be necessary.

	A	B	C	D
1	TOTAL OPERATIONS	TOTAL	TOTAL	TOTAL
2	BUDGET SUMMARY	ACTUAL	BUDGET	REQUEST
3	OCTOBER 1987	1987	1988	1989
4	*****			
5	RESOURCES			
6				
7				
8	GENERAL FUND	9644596	10529892	12337825
9	FEDERAL FUNDS	4657352	6545592	6554677
10	CONSERVATION FUND	1694648	1671050	1676025
11	MARINE FUEL	558576	547179	397179
12	ADMINISTRATION FUND	299343	297000	297000
13	PARK USER FEE	80143	193948	118948
14	CEDAR ROCK OPERATIONS	85877	70439	70439
15	LOTTERY	155832	75000	0
16	UTILITY REFUND	477045	185961	185961
17	OIL OVERCHARGE	163653	472634	472634
18	OIL OVERCHARGE GW 6220	0	716250	619301
19	OIL OVERCHARGE GW BIS 8 6210	0	681000	681000
20	OIL OVERCHARGE GW RWA 6230	0	293706	532175
21	OIL OVRCHARGE GW SOLID 6240	0	100000	100000
22	OIL OVRCHARGE GW LND ALTG230	0	194026	335995
23	STORAGE TANK ACCT	0	260211	260211
24	AS MANAGEMENT ACCT	0	34796	52316
25	SOLID WASTE ACCT	0	359265	359265
26	LEASE PURCHASE	12946	295461	295461
27	OTHER FUNDS	27842	67197	398212
28	CORPS PROJECTS	319302	318023	314903
29	FISH & WILDLIFE FUND	11430632	12218189	12291191
30	TRANSFER F&N	2173353	2174245	2377104
31				
32				
33	TOTAL REVENUES	31781180	38299065	40729822
34				
35				
36				
37	EXPENDITURES			
38				
39	WTE	855.55	973.10	992.63
40				
41	PERSONNEL	21851609	25320978	26331767
42	PERSONAL TRAVEL	641096	784168	849005
43	VEHICLE OPERATION	666081	740830	750534
44	VEHICLE DEPRECIATION	688030	911880	913880
45	OFFICE SUPPLIES	658876	674200	675502
46	FAC MAINT SUPPLIES	855418	883640	1417642
47	EQUIP MAINT SUPPLIES	698606	733715	733715
48	PROP/SCIEN SUPPLIES	450	27680	27905
49	CONS SUPPLIES	404268	450355	450355
50	OTHER SUPPLIES	184443	191850	191850
51	PRINTING	493294	508338	506338
52	UNIFORMS	153086	193630	194630
53	COMMUNICATIONS	457488	479925	488925
54	RENTALS	119603	105085	105083
55	UTILITIES	500890	559500	603100
56	PROP/SCIEN SERVICES	1427082	3669573	4005025
57	OUTSIDE SERVICES	410155	399885	399885
58	INTRA STATE TRANSFERS	0	500	500
59	ADVERTISING	6344	10295	10295
60	OUTSIDE REPAIRS	4312	0	0
61	DATA PROCESSING	341253	381950	398312
62	AUDITORS REIMBURSEMENT	20089	37275	37275
63	STATE REIMBURSEMENT	154251	140250	140012
64	EQUIPMENT	976789	1075930	1481428
65	OTHER EXPENSE	180895	12671	12671
66	LICENCE FEES	3771	3950	4188
67				
68				
69	TOTAL EXPENDITURES	31781180	38299065	40729822
70				
71				

DIRECTOR'S OFFICE
Budget FY88 and Budget Request FY89

This budget unit includes the resources and expenditures for the operation of the Director's office, Deputy, and secretarial staff. This unit also reflects the per diem and expenses necessary for the Environmental Protection Commission, and the Natural Resources Commission. No significant changes or additions as compared to FY88 are requested.

	A	B	C	D
	DIR	DIR	DIR	DIR
	ACTUAL	BUDGET	REQUEST	REQUEST
	1987	1988	1989	1989
1	*****			
2	*****			
3	*****			
4	*****			
5	*****			
6	*****			
7	*****			
8	*****			
9	*****			
10	*****			
11	*****			
12	*****			
13	*****			
14	*****			
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20	*****			
21	*****			
22	*****			
23	*****			
24	*****			
25	*****			
26	*****			
27	*****			

COORDINATION AND INFORMATION DIVISION
Base Budget Description and Decision Packages, FY89 Request

Base Budget. At this level, planning capabilities and Information and Education activities would be cut substantially. Support costs would be reduced, and no funds would be budgeted for equipment replacement or major facility maintenance. The Education Center, legal staff, and CCB staff would be continued at the current level.

Base FTE 36.82

Estimated Cost \$1,795,023

1. Vehicle Replacement. This decision package restores funding for division vehicle replacement.

F.T.E. 0

Estimated Cost \$5,100

2. Planning and Field I & E. This decision packages restores a currently funded Outdoor Recreation Planning position, an Information Specialist II at Clear Lake, an Information Specialist II at Iowa City, and related support.

F.T.E. 3.0

Estimated Cost \$121,072

3. Newsletters, Radio and TV Spots. This decision package restores two Information Specialist II's utilized currently for newsletter production and coordination and production of radio and television public service announcements, plus related support.

F.T.E. 2.0

Estimated Cost \$57,464

4. Graphics and Photographic Support. This decision package restores staff support to the current level for graphic and photography related to publications and television public service announcements.

F.T.E. 2.5

Estimated Cost \$73,435

5. Improve Planning Capabilities. This decision package adds one planning position and support for contract surveys improve the DNR's capability to respond to various planning mandates and needs such as the Open Spaces, Trails and RTL initiatives.

F.T.E. 1.0

Estimated Cost \$46,000

6. Improve Magazine Circulation and TV PSE's. This package provides for the replacement of a video camera used for TV public service announcement production; and funds a contract relating to surveying magazine readers regarding needs and attitudes.

F.T.E. 0

Estimated Cost \$25,000

7. Productivity Improvement. This packages provides funding to equipment legal, planning, and I & E staff with personal computers to a greater degree. Current DNR experience indicates that staff productivity, particularly with regard to writing, data analysis, and communications can be significantly improved with this tool.

F.T.E. 0 Estimated Cost \$45,000

8. Facility Maintenance and Equipment. This decision package funds the purchase of kitchen and office equipment at the Conservation Education Center; and provides for renovation of the Center's parking lot.

F.T.E. 0 Estimated Cost \$45,000

Total FTE's Requested 45.32 Total Estimated Cost \$2,213,094

	A	B	C	D
	COORDINATION & INFORMATION DIVISION	C&I	C&I	C&I
	BUDGET SUMMARY	ACTUAL	BUDGET	REQUEST
	OCTOBER 1987	1987	1988	1989

1				
2				
3				
4				
5				
6	EXPENDITURES			
7				
8	#FTE	38.84	44.32	45.32
9				
10	PERSONNEL	1228868	1374602	1447942
11	PERSONAL TRAVEL	37572	55140	65140
12	VEHICLE OPERATION	5550	6382	6382
13	VEHICLE DEPRECIATION	6820	5100	5100
14	OFFICE SUPPLIES	67400	59050	59050
15	FAC MAINT SUPPLIES	22767	20500	40500
16	EQUIP MAINT SUPPLIES	10816	10000	10000
17	PROF/SCIENT SUPPLIES	64	0	0
18	CONS SUPPLIES	2178	1750	1750
19	OTHER SUPPLIES	28682	26730	26730
20	PRINTING	246220	276900	276900
21	UNIFORMS	1839	2650	2650
22	COMMUNICATIONS	5461	5600	5600
23	RENTALS	1817	1350	1350
24	UTILITIES	25797	27000	27000
25	PROF/SCIEN SERVICES	7990	25000	40000
26	OUTSIDE SERVICES	36846	35750	35750
27	DATA PROCESSING	10790	43100	43100
28	STATE REIMBURSEMENT	12160	2150	2150
29	EQUIPMENT	3520	26000	116000
30	LICENCE FEES	30	0	0
31				
32				
33	TOTAL EXPENDITURES	1763187	2004754	2213094
34				
35				

ADMINISTRATIVES SERVICES DIVISION
Base Budget and Decision Packages, FY89 Budget Request

Base Budget. At the 75% base level, support staff would be reduced to reflect a similar, expected reduction in operational programs. Land Acquisition staff and Construction Services staff would be reduced to a "caretaker" level, because it is reasonably assumed there would be little capital acquisition and development if the DNR were funded at only 75% of the current level.

Base FTE 91.55 Estimated Cost \$3,184,398

1. Vehicle Replacement. This decision packages restores funding for the replacement of vehicles in the central office vehicle pool and in the Construction Services Bureau.

F.T.E. 0 Estimated Cost \$52,080

2. Clerical and Fiscal Support. This decision package restores six clerical and fiscal support positions. This package also partially restores support above the 75% level for "pooled" central office expenses such as postage, office supplies and communications.

F.T.E. 6.0 Estimated Cost \$269,482

3. Land Acquisition Support. This decision package restores four positions to the Land Acquisition and Management Bureau. These positions are necessary to carry out the land appraisal, negotiation and relocation activities for the DNR.

F.T.E. 4.0 Estimated Cost \$140,640

4. Construction Services Support. This decision package restores 19 positions for the design and contract administration of DNR development and renovation projects. This activity is funded to a significant degree by earmarked funds, and has little impact on the General fund. It was assumed at the base level that capital development activities would be halted.

F.T.E. 19.0 Estimated Cost \$603,785

5. Budget, Grants and D.P. Support. This decision package restores four positions in the budget, grants administration and data processing support areas not included in the base. These positions are necessary to continue the current level of activities in these administrative service areas.

F.T.E. 4.0 Estimated Cost \$133,805

6. Clerical and Fiscal Support. An earlier decision package partially restored support in this area. This package restores support to the FY88 level. Without these positions, the DNR would have serious problems processing routine financial transactions and providing routine services to the public and to DNR managers.

F.T.E. 5.3

Estimated Cost \$101,864

7. DNR Safety Program. This position was established in FY88 through the reallocation of an existing position. The purpose of this position is to follow through on earlier DNR planning effort regarding implementation of the chemical "right-to-know" act. In addition, this position is reviewing agency operations for adherence to federal and state safety requirements, writing training and procedures manuals in the safety area, and conducting training sessions.

F.T.E. 1.0

Estimated Cost \$26,000

8. Equipment Purchases. This decision package funds the purchase of a computer aided design system for the Construction Services Bureau, several additional personal computers to improve staff productivity, replacement of office furniture, and replacement of miscellaneous office equipment.

F.T.E. 0

Estimated Cost \$50,000

Total FTE 130.85

Total Estimated Cost \$4,562,054

	A	B	C	D
	ADMIN	ADMIN	ADMIN	ADMIN
	ACTUAL	BUDGET	REQUEST	
	1987	1988	1989	
1	ADMINISTRATIVE SERVICES DIVISION			
2	BUDGET SUMMARY			
3	OCTOBER 1987			
4	*****			
5				
6	EXPENDITURES			
7				
8	#FTE	110.07	130.85	130.85
9				
10	PERSONNEL	2837690	3379705	3499033
11	PERSONAL TRAVEL	36969	63000	64000
12	VEHICLE OPERATION	34323	38471	39471
13	VEHICLE DEPRECIATION	24470	52080	52080
14	OFFICE SUPPLIES	273233	286500	288000
15	FAC MAINT SUPPLIES	980	10500	10500
16	EQUIP MAINT SUPPLIES	74484	75000	75000
17	OTHER SUPPLIES	16761	16700	16700
18	PRINTING	21708	16950	16950
19	UNIFORMS	2641	3800	3800
20	COMMUNICATIONS	170827	182000	192000
21	RENTALS	2935	1500	1500
22	OUTSIDE SERVICES	22638	20750	20750
23	ADVERTISING	260	1250	1250
24	DATA PROCESSING	163763	137000	137000
25	AUDITORS REIMBURSEMENT	20089	37000	37000
26	STATE REIMBURSEMENT	10672	9300	9300
27	EQUIPMENT	86606	30000	97500
28	OTHER EXPENSE	135	100	100
29	LICENCE FEES	120	120	120
30				
31	-----			
32	TOTAL EXPENDITURES	3801324	4361726	4562054
33				

PARKS, RECREATION AND PRESERVES DIVISION
Base Budget and Decision Packages, FY89 Budget Request

Base Budget. At the 75% base budget level, division staffing levels would be reduced by twelve park attendant positions, two district supervisor positions, and all seasonal help positions. Facility maintenance activities would be reduced to almost zero, with the exception of projects funded through the Park User Fee Fund.

Base FTE 136.08 Estimated Cost \$4,987,346

1. Staff Parks and Recreation Areas at FY88 Level. This package restores authorized staffing to pre FY88 levels for seasonal positions. At the base level, the seasonal positions were eliminated. Without these positions, many park and recreation area facilities would be closed to the public, and open areas would be poorly maintained.

F.T.E. 79.44 Estimated Cost \$913,751 r

2. Park Maintenance. This decision package restores facility maintenance (trash bags, toilet paper, cleaning supplies, and minor repairs) to approximately the FY88 level. Please note that the FY88 facility maintenance level was approximately two thirds less than funding for this function in the 1970's.

F.T.E. 0 Estimated Cost \$161,936

3. Vehicle Replacement. This decision package restores funding for replacement of park and recreation area pickups, trucks, etc. There are insufficient reserves in the Vehicle Dispatcher's depreciation fund for FY89 replacement without this package.

F.T.E. 0 Estimated Cost \$257,040

4. Utilities for New Facilities. This package increases the utility budget to provide for new facilities at Lake Manawa, Pleasant Creek, Marble Beach, and other areas.

F.T.E. 0 Estimated Cost \$20,000

5. Natural Area Field Surveys. This decision package restores one position and support for continuing field surveys of natural areas for rare plant and animal communities.

F.T.E. 1.0 Estimated Cost \$31,908

6. Preserves and Endangered Species Research. This package continues funding for research projects to supplement the survey work of the Natural Areas Inventory Program and the study of state preserves.

F.T.E. 0 Estimated Cost \$33,600

7. Park and Recreation Area Maintenance. This package provides for funding park and recreation area maintenance at the levels provided in the late 1970's and early 1980's. During the past five years, facility maintenance and equipment replacement has been deferred to meet reoccurring cutbacks in General fund support for parks and recreation areas. Park User Fees are available for "renovation and replacement" of existing facilities, but very little funding has been available for routine day-to-day maintenance. Replacement of mowers, tractors, chainsaws, etc., has been at a virtual standstill for the past four years. This package will restore \$500,000 for small facility repair projects and \$150,000 for equipment replacement. This request will not enable the DNR to "catch up" all at once in this regard, but simply allows for a reasonable start.

F.T.E. 0

Estimated Cost \$650,000

8. Improve Visitor Services. This package funds the addition of two park attendant positions, one at Nine Eagles Park and the other at George Wyth Park. Nine Eagles is a very popular park, and is currently staffed with only one full time ranger position. This means the park is frequently unattended on days-off, vacation, etc. George Wyth is Iowa's second-most visited park and is becoming popular on a year-around basis with the new facilities added in the past seven years. George Wyth is currently staffed with one full time ranger and attendant.

F.T.E. 2.0

Estimated Cost \$41,000

9. Increase Preserves Studies and Maintenance. This package provides additional funding for contract scientific studies of current and proposed state preserves sites; and for better maintenance of existing state preserves.

F.T.E. 0

Estimated Cost \$28,350

Total FTE 218.52

Total Estimated Cost \$7,124,931

	A	B	C	D
1	PARKS PRESERVES & RECREATION DIVISION	PARKS	PARKS	PARKS
2	BUDGET SUMMARY	ACTUAL	BUDGET	REQUEST
3	OCTOBER 1987	1987	1988	1989
4	*****			
5				
6	EXPENDITURES			
7				
8	#FTE	186.23	206.99	218.52
9				
10	PERSONNEL	3690001	4178234	4432252
11	PERSONAL TRAVEL	61995	64998	69998
12	VEHICLE OPERATION	153426	176439	176439
13	VEHICLE DEPRECIATION	166425	257040	257040
14	OFFICE SUPPLIES	63334	65200	65202
15	FAC MAINT SUPPLIES	342058	343370	857372
16	EQUIP MAINT SUPPLIES	240990	248000	248000
17	CONS SUPPLIES	19602	19500	19500
18	OTHER SUPPLIES	19009	20600	20600
19	PRINTING	20452	21700	21700
20	UNIFORMS	33968	46900	46900
21	COMMUNICATIONS	66600	67520	67520
22	RENTALS	24242	23550	23548
23	UTILITIES	280634	309000	352600
24	PROF/SCIEN SERVICES	2279	57779	48529
25	OUTSIDE SERVICES	176075	151100	151100
26	ADVERTISING	0	4080	4080
27	OUTSIDE REPAIRS	3535	0	0
28	DATA PROCESSING	4941	8100	8102
29	STATE REIMBURSEMENT	6210	5100	5102
30	EQUIPMENT	87400	89500	239498
31	OTHER EXPENSE	1956	7351	7351
32	LICENCE FEES	2471	2500	2498
33				
34	-----			
35	TOTAL EXPENDITURES	5467603	6167561	7124931
36	-----			
37				

FORESTS AND FORESTRY DIVISION
Base Budget and Decision Packages, FY89 Budget Request

Base Budget. At the 75% base budget level, production at the Nursery would be reduced by approximately 20%, the District Forestry staff would be reduced by two District Forestry positions; the Utilization and Marketing program would be eliminated; support for the Prison Labor program would be reduced; maintenance at state forests would be significant cut back; and related support items would be reduced in a corresponding manner.

Base FTE 43.56 Estimated Cost \$1,539,801

1. Vehicle Replacement. This package provides funding for replacement of forestry pickups, trucks and cars. Replacement in FY89 is dependent on this package as there is no significant reserve in the Vehicle Dispatcher's depreciation fund for this division.

F.T.E. 0 Estimated Cost \$115,200

2. Farm Forestry Program. This decision package restores a Forester position and a Forester supervisory position not included in the 75% base budget package, plus related support. This package restores the Farm Forestry Program to the FY88 level.

F.T.E. 2.0 Estimated Cost \$69,754

3. Yellow River Prison Labor. This package restores funding for supervision of one inmate work crew, and support, for forest and recreation area maintenance in N.E. Iowa.

F.T.E. 1.0 Estimated Cost \$37,285

4. Nursery Production. This packages brings operations at the Nursery to the current level. At the base level, the current level of stock sales would be maintained for FY89, but planting for future years' production would have been reduced. This package maintains staffing, supplies, etc., at the FY88 leve.

F.T.E. 3.00 Estimated Cost \$34,483

5. Insect & Disease, Forest Maintenance. This package bring staffing, one full time position and seasonal help, to the current level for the Insect & Disease program and for maintenance at state forests.

F.T.E. 2.08 Estimated Cost \$36,390

6. Equipment Replacement. This package provides funds for the replacement of high priority maintenance equipment, tractors, mowers, chainsaws, etc. Due to General fund cut backs, equipment replacement has generally been deferred for the past four years. This package does not address all the replacement needs, just the high priority problems.

F.T.E. 0

Estimated Cost \$86,000

Total FTE 51.64

Total Estimated Cost \$1,918,913

	A	B	C	D
	FORESTRY DIVISION	FORESTRY	FORESTRY	FORESTRY
	BUDGET SUMMARY	ACTUAL	BUDGET	REQUEST
	OCTOBER 1987	1987	1988	1989

6	EXPENDITURES			
8	#FTE	48.34	51.64	51.64
10	PERSONNEL	1213261	1292764	1304502
11	PERSONAL TRAVEL	26848	30440	30470
12	VEHICLE OPERATION	49875	57356	57326
13	VEHICLE DEPRECIATION	69170	115200	115200
14	OFFICE SUPPLIES	11774	13200	13200
15	FAC MAINT SUPPLIES	16040	16700	16700
16	EQUIP MAINT SUPPLIES	47577	42510	42510
17	CONS SUPPLIES	59017	65900	65900
18	OTHER SUPPLIES	9899	11975	11975
19	PRINTING	4058	8095	8095
20	UNIFORMS	9569	12350	12350
21	COMMUNICATIONS	22804	22780	22780
22	RENTALS	16553	13305	13305
23	UTILITIES	25025	27000	27000
24	OUTSIDE SERVICES	62040	64900	64900
25	ADVERTISING	715	650	650
26	DATA PROCESSING	7617	5900	5900
27	STATE REIMBURSEMENT	840	2550	2550
28	EQUIPMENT	2213	15000	101000
29	OTHER EXPENSE	0	1800	1800
30	LICENCE FEES	321	800	800
33	TOTAL EXPENDITURES	1655216	1821175	1918913

ENERGY AND GEOLOGICAL RESOURCES DIVISION
Base Budget and Decision Packages, FY89 Budget Request

Base Budget. The 75% base budget for this division includes all of the positions in the Energy Bureau and the positions in the Geology Bureau that are not funded in whole or in part with General funds. Thus, most of the division's budget is included in the base, and only the portion of the budget affected by the General fund is reflected in the decision packages. No staffing increase is anticipated in the Energy Bureau. Geology staffing increases funded by the General fund are reflected in the decision packages.

Base FTE 48.0

Estimated Cost \$3,798,232

1. Vehicle Replacement. This decision package restores funding for the replacement of Geology Bureau vehicles. Replacement of vehicles in FY89 is wholly dependent on funding this package because there are no significant reserve funds available in the Vehicle Dispatcher's depreciation fund.

F.T.E. 0

Estimated Cost \$21,240

2. Research Drilling Program. This package restores staffing and support for the Geology Bureau's research drilling program. This operation provides technical support for geologic investigations relating to water quality and quantity, and related geologic data.

F.T.E. 3.0

Estimated Cost \$80,338

3. Geologic Data Analysis. This package restores funding to continue the analysis of well drilling cuttings and core samples. This is an ongoing program, and the bureau is already has a backlog of several year's worth of sample cores and cuttings to analyze at current funding levels.

F.T.E. 3.0

Estimated Cost \$75,259

4. Missouri Water Source Investigation. This package continues funding for a study to assess the availability of water from the Missouri river to S.W. Iowa.

F.T.E. .5

Estimated Cost \$21,350

5. Gas/Oil Core Sample Analysis. This package restores funding for the analysis of core samples related to gas and oil exploration. This is a continuing program and there is a several year backlog in this area at current funding levels.

F.T.E. 1.0

Estimated Cost \$41,350

6. Replace Drill Rig Truck. This package provides funding to replace the truck on which is mounted the bureau's drilling rig. Routine replacement of this unit has been deferred for several years due to General fund reductions.

F.T.E. 0

Estimated Cost \$30,000

Total FTE 55.5

Total Estimated Cost \$4,0677,744

	A	B	C	D
	ENERGY & GEOLOGICAL SERVICES DIVISION	ENRGY/GEO	ENRGY/GEO	ENRGY/GEO
	BUDGET SUMMARY	ACTUAL	BUDGET	REQUEST
	OCTOBER 1987	1987	1988	1989
1	*****			
2	*****			
3	*****			
4	*****			
5	*****			
6	*****			
7	*****			
8	EXPENDITURES			
9	#FTE	41.65	53.50	55.50
10	PERSONNEL	1301309	1629693	1799035
11	PERSONAL TRAVEL	49185	65114	76564
12	VEHICLE OPERATION	18030	37000	40734
13	VEHICLE DEPRECIATION	10880	21240	21240
14	OFFICE SUPPLIES	13262	15650	15450
15	FAC MAINT SUPPLIES	1406	2800	2800
16	EQUIP MAINT SUPPLIES	1531	6600	6600
17	PROF/SCIENT SUPPLIES	367	26660	26885
18	CONS SUPPLIES	110	0	0
19	OTHER SUPPLIES	18756	10250	10250
20	PRINTING	28025	67743	67743
21	COMMUNICATIONS	16646	18755	18755
22	RENTALS	5262	6150	6150
23	UTILITIES	810	450	450
24	PROF/SCIEN SERVICES	599330	1819753	1864453
25	OUTSIDE SERVICES	22455	20000	20000
26	INTRA STATE TRANSFERS	0	500	500
27	ADVERTISING	1071	500	500
28	OUTSIDE REPAIRS	777	0	0
29	DATA PROCESSING	13388	23800	40150
30	AUDITORS REIMBURSEMENT	0	275	275
31	STATE REIMBURSEMENT	1494	2000	2000
32	EQUIPMENT	10609	37150	47150
33	LICENCE FEES	340	60	60
34				
35				
36	TOTAL EXPENDITURES	2115043	3812143	4067744
37				
38				

ENVIRONMENTAL PROTECTION DIVISION
Base Budget and Decision Packages, FY89 Budget Request

Base Budget. The base budget for this division includes all of the functions funded partially or wholly with federal funds and/or Groundwater funds. Federally mandated and cost-shared functions are included in the base in order to meet minimum federal requirements regarding environmental monitoring and protection. At the base level, the division would not maintain programs relating to the regulation, withdrawal and storage of water; and regulation and monitoring of floodplains and dam safety.

Base FTE 132.5 Estimated Cost \$6,703,887

1. Vehicle Replacement. This decision package restores funding for division vehicle replacement. Replacement of vehicles in FY89 is wholly dependent on this funding package, as the Vehicle Dispatcher's depreciation fund does not contain any significant reserves for this purpose.

F.T.E. 0 Estimated Cost \$34,620

2. UHL Contract Increase. This package provides for an increase proposed by the UHL. The UHL, in current contract negotiations, indicated their intent to recover the full cost of contract work, including overhead. A contingency is required in the event they are not willing to reduce their request.

F.T.E. 0 Estimated Cost \$200,000

3. State Water Program. This package restores funding for continuing the state's program relating to water withdrawal, diversion, and storage.

F.T.E. 3.0 Estimated Cost \$121,636

4. Floodplain/Dam Regulation Program. This package restores funding for the existing DNR effort relating to regulating construction and deposition activities in floodplains, stream channelization, and dam construction permitting and safety inspection.

F.T.E. 8.0 Estimated Cost \$304,648

5. Increase Floodplain Services. Enhance the State Flood plain and dam safety program in order to provide for annual inspection of the state's high hazard dams as opposed to the current every two years inspection schedule; provide for inspection of all other dams every two years as compared to the current three years; provide for more field inspection activities to discover and correct illegal flood plain activities; and provide for mapping the floodplains of all rivers of the state within three years. With current staffing, there is a large work backlog and slow turnaround time related to dam permits and floodplain construction permits.

F.T.E. 5.0

Estimated Cost \$275,000

Total FTE 148.50

Total Estimated Cost \$7,639,791

	A	B	C	D
	ENVIRON	ENVIRON	ENVIRON	
	ACTUAL	BUDGET	REQUEST	
	1987	1988	1989	
1	ENVIRONMENTAL PROTECTION DIVISION			
2	BUDGET SUMMARY			
3	OCTOBER 1987			
4	*****			
5				
6	EXPENDITURES			
7				
8	#FTE	110.95	143.50	148.50
9				
10	PERSONNEL	3817877	4998119	5220217
11	PERSONAL TRAVEL	65627	120837	132837
12	VEHICLE OPERATION	21547	43182	48182
13	VEHICLE DEPRECIATION	19520	34620	36620
14	OFFICE SUPPLIES	19322	24940	24940
15	FAC MAINT SUPPLIES	571	520	520
16	EQUIP MAINT SUPPLIES	6749	6755	6755
17	PROF/SCIENT SUPPLIES	19	1020	1020
18	CONS SUPPLIES	665	1800	1800
19	OTHER SUPPLIES	4659	4870	4870
20	PRINTING	8410	11860	11860
21	UNIFORMS	622	560	560
22	COMMUNICATIONS	26515	27005	27005
23	RENTALS	38458	30150	30150
24	UTILITIES	6526	6000	6000
25	PROF/SCIEN SERVICES	650274	1351025	1636025
26	OUTSIDE SERVICES	8695	10370	10370
27	ADVERTISING	1289	1275	1275
28	DATA PROCESSING	120969	124150	124150
29	STATE REIMBURSEMENT	6502	4560	4460
30	EQUIPMENT	181975	308780	309780
31	LICENCE FEES	396	295	395
32				
33				
34	TOTAL EXPENDITURES	5007187	7112693	7639791
35				
36				

FISH AND WILDLIFE DIVISION
Base Budget and Decision Packages, FY89 Budget Request

Base Budget. At the 75% base budget level, all three programs, Law Enforcement, Fisheries, and Wildlife, were reduced to the 75% level. Even though this division is funded with earmarked funds, it is necessary to go through the same priority setting process as other divisions because the General Assembly sets (appropriates) an expenditure limit for division operations. At the base level, all seasonal positions would be eliminated. Law Enforcement staffing would be reduced by twelve officer positions, and the recreational safety positions. The Rathbun hatchery would be closed, and fifteen fisheries management and research positions would be eliminated. Likewise, twenty four wildlife positions would be cut. The decision packages restore these positions in priority order. The Fish and Wildlife division is not requesting any significant program expansion.

Base FTE 221.93 Estimated cost \$9,478,545

1. Vehicle Depreciation. This package restores funding for the replacement of pickups, trucks, patrol vehicles, and cars.

F.T.E. 0 Estimated cost \$426,600

2. Restore Division Operations to 85% of Current. This package restores staffing and support to increase the level of division operations from 75% to approximately 85% of the FY88 level. This includes twelve Conservation Officers, 9.9 F.T.E. for the Rathbun hatchery, 6 positions for various fisheries research and management activities, and 12 positions for wildlife management and research functions.

F.T.E. 38.78 Estimated Cost \$1,197,820

3. Increase Operations to 95% of FY88 Level. This package restores staff and additional support to bring division operations to approximately 95% of the FY88 level of activity. This includes 8 officers and the recreational safety coordinator, 5 fisheries staff, and 8 wildlife staff.

F.T.E. 22.0 Estimated Cost \$667,801

4. Bring Operations to FY88 Level. This package restores staff and support to bring division operations to the FY88 level. This includes restoring all of the current seasonal positions, 5 full time wildlife staff, and 4 full time fisheries staff.

F.T.E. 42.64 Estimated cost \$835,328

Total FTE 325.35 Total Estimated cost \$12,606,094

	A	B	C	D
	FISH & WILDLIFE DIVISION	F&W	F&W	F&W
	BUDGET SUMMARY	ACTUAL	BUDGET	REQUEST
	OCTOBER 1987	1987	1988	1989

6	EXPENDITURES			
8	#FTE	313.32	325.35	325.35
10	PERSONNEL	7590923	8074460	8125985
11	PERSONAL TRAVEL	328682	327639	347996
12	VEHICLE OPERATION	383330	382000	382000
13	VEHICLE DEPRECIATION	390745	426600	426600
14	OFFICE SUPPLIES	206505	205460	205460
15	FAC MAINT SUPPLIES	471596	489250	489250
16	EQUIP MAINT SUPPLIES	315687	344100	344100
17	CONS SUPPLIES	322696	361405	361405
18	OTHER SUPPLIES	86671	100625	100625
19	PRINTING	159668	100090	98090
20	UNIFORMS	104447	127370	128370
21	COMMUNICATIONS	148562	155965	154965
22	RENTALS	30259	28980	28980
23	UTILITIES	162098	190050	190050
24	PROF/SCIEN SERVICES	166709	415018	415018
25	OUTSIDE SERVICES	84055	96265	96265
26	ADVERTISING	2669	2540	2540
27	DATA PROCESSING	15271	34900	34910
28	STATE REIMBURSEMENT	116265	114400	114250
29	EQUIPMENT	564466	555500	555500
30	OTHER EXPENSE	98804	3420	3420
31	LICENCE FEES	93	175	315
32				
33				
34	TOTAL EXPENDITURES	11750201	12536212	12606094
35				
36				

WASTE MANAGEMENT AUTHORITY DIVISION
 Budget FY88, and Budget Request FY89

This division was created by S.F. 396 passed by the 1987 G.A. Division operations are funded completely by Groundwater related revenues in FY88 and FY89. The mission of this division is to encourage and promote the proper and safe management of solid, toxic, hazardous and low-level radioactive wastes generated in Iowa through cooperation with other public and private agencies or operation of such state owned facilities as may be necessary.

Budgets for various contracts and programs under the jurisdiction of this division are included in the various Groundwater accounts.

	A	B	C	D
	WASTE MGT AUTHORITY	WMA	WMA	WMA
	BUDGET SUMMARY	ACTUAL	BUDGET	REQUEST
	OCTOBER 1987	1987	1988	1989
1	*****			
2	*****			
3	*****			
4	*****			
5	*****			
6	EXPENDITURES			
7				
8	#FTE	.00	4.00	11.00
9				
10	PERSONNEL	0	205600	315000
11	PERSONAL TRAVEL	0	20000	25000
12	EQUIPMENT	0	15000	15000
13				
14	-----			
15	TOTAL EXPENDITURES	0	240600	355000
16				
17	-----			

MISCELLANEOUS SEPARATE BUDGET REQUESTS REQUIRING G.A. APPROVAL
Base Budgets and Decision Packages, FY89 Budget Request

U.S.G.S COOPERATIVE PROGRAM

Base Budget. At the 75% level, funds would be provided to continue the cooperative drilling and stream gauging program at the FY88 level. Funds for topographical map development would be reduced.

F.T.E. 0 Estimated Cost \$139,487

1. Topographical Map Development. This package restores funding to continue topographical map preparation with the USGS at the FY88 level.

F.T.E. 0 Estimated Cost \$46,496

GREEN THUMB PROGRAM.

Base Budget. At the base level, funding would be reduced by 25% for both the state's program and the county cost-share program. All funds appropriated for this program are used for salary payments to senior citizen participants in the program.

F.T.E. 14.0 Estimated Cost \$150,000

1. Restore Green Thumb Program to FY88 Level. This decision package would simply restore the funds necessary to reach base, and continue the program at the level appropriated in FY88.

F.T.E. 4.0 Estimated Cost \$49,800

5% SEWAGE WORKS GRANTS

The State has provided a 5% matching grant to local communities for sewage treatment projects as a supplement to federal grants funds for the same purpose. Previously, the 5% state grant was provided to the community at the same time it received the federal grant. However, the 5% grant is not a prerequisite to receiving the federal grant. In this DNR budget package, the staff recommends that the General Assembly appropriate sufficient grant funds to (1) provide the 5% grant to all communities who have received federal grants through FY88, but have not received a guarantee of the 5% state grant; and (2) provide 5% state grants funds sufficient to meet the state's commitment in this regard relative to expected FY89 federal grants. Because of the state's budget process, the request is presented in the following order.

1. Supplemental Appropriation.

\$493,000 is requested as a supplemental appropriation to replace the funds "borrowed" from earlier appropriations to pay the AIDEX bill.

2. 5% Grant Program Base Level Request.

\$957,547 is requested as the "base" level (75% of the FY87 appropriation) for the 5% grant program.

3. 5% Grant Program Decision Package.

\$291,453 is requested as first priority in addition to the supplemental request and the base request explained previously. Together, the supplemental request, the base, and this package will provide a total of \$1,742,000 in 5% grant funds to communities that have already received federal funds.

4. 5% Grant Program Funds, FY89.

\$1,105,000 is requested to provide a 5% state grant to match federal funds expected to be provided for FY89 for sewage works construction. This is expected to be the last year of the federal grant program.

LOCAL SEWAGE WORKS CONSTRUCTION REVOLVING FUND

\$3,285,120 is requested from the General fund as "seed" money, along with \$16,425,600 from the E.P.A. to capitalize a revolving loan fund to be used by local communities to fund future sewage treatment projects. The E.P.A. is phasing out the federal grant program in FY89 and is replacing it with a loan program.

CAPITAL ACQUISITION AND DEVELOPMENT

DNR's capital acquisition and development activities are funded from several different sources: the Fish and Wildlife trust fund; the Marine Fuel Tax fund; Lottery (Iowa Plan) revenues; Park User Fees; and the General fund. A brief summary of each is given below with detailed schedules provided as separate attachments.

1. Fish and Wildlife Trust Fund.

Capitals funded by this source relate to Fish and Wildlife purposes. \$3,550,000 is estimated to be expended in FY88 and \$4,178,000 in FY89. Due to increased federal aid for fisheries restoration, activity in this area has increased dramatically. Major projects include the Decorah Fish Hatchery renovation, and the development of several fishing lakes.

2. Marine Fuel Tax Fund.

These revenues can be used for acquisition and development related to recreational boating. \$1,849,000 is estimated to be expended in FY88 and \$1,800,000 in FY89. Projects include a large number of boat access developments and cost-sharing of boat facilities with cities and counties.

3. Park User Fee Fund.

Park User fees are appropriated "solely for renovation and replacement of existing park facilities." No additional legislative appropriation action is required. The DNR estimates that \$1,845,396 will be expended in FY88 and \$1,480,000 in FY89.

4. Iowa Plan (Lottery) Projects.

The intent of the original Iowa Plan legislation was to use lottery funds for economic development. Four program were established within the DNR: (1) State Forest, Park and Wildlife Acquisition; (2) Public/Private acquisition of unique natural areas; (3) grants to county conservation boards for recreation and tourism projects; and (4) development of state recreation and park areas.

\$2,000,000 was appropriated for these purposes in FY88 with several specific projects directed by legislative action. \$7,017,000 is requested for similar projects in FY89.

4. General Fund Capitals.

The DNR has requested \$2,697,000 for acquisition and development projects that do not fit readily into the other funding categories.

Historically, the State Conservation Commission received several million dollars each year for major maintenance and development of state parks, forests and recreation areas. From 1974 through 1980, the ICC received an average annual General fund capital ap-

appropriation of \$3.8 million. From 1981 through 1986, the average General fund capital appropriation was \$323,325. No appropriation was received for capitals in 1981, 1982, and 1986.

The original intent of both the Park User Fee fund, and the Iowa Plan was to supplemental General funds for park, recreation and forest area capitals. However, the result is obviously that these new sources have simply made possible a greatly decreased commitment from the state General fund.

IOWA DEPARTMENT OF NATURAL RESOURCES
FISH AND WILDLIFE TRUST FUND, CAPITAL IMPROVEMENTS
FY88

Project Description	Fed Aid	State	Total
Wildlife Habitat Program			
State Habitat Acquisition	\$ ---	\$ 210,000	\$ 210,000
Habitat Enhancement cost-share programs	---	100,000	100,000
Property Taxes, State	---	40,000	40,000
County Cost-Share Program	---	350,000	350,000
Total	---	\$ 700,000	\$ 700,000
Waterfowl Program			
Green Island, Dikes, Pump Station, Parking, etc.	375,000	125,000	500,000
Shimon Marsh, Water Control Structure	15,000	5,000	20,000
Princeton Pump House	---	8,000	8,000
Otter Creek Marsh, Water Control Structure	---	15,000	15,000
Sweet Marsh, Dike Renovation	---	6,000	6,000
Colyn Spillway Renovation	---	15,000	15,000
Otter Creek Marsh, Channel	---	10,000	10,000
Big Marsh, West Fork Control Structure	---	12,000	12,000
Weise Slough, Water Control Structure	---	5,000	5,000
Big Marsh, Middle Pool Spillway Extension	---	14,000	14,000
D.U. Grant	---	30,000	30,000
Total	390,000	245,000	635,000
Wildlife Area Development			
Mt. Ayr Storage Bldg.	---	17,000	17,000
Sand Creek Bridge	---	10,000	10,000
Sweet Marsh, Service Bldg Remodeling/Renovation	---	20,000	20,000
McPaul Access, Bank Stabilization	---	25,000	25,000
Fox Hills, Residence and Service Bldg.	---	120,000	120,000
Total	---	192,000	192,000
Non-Game Program			
Windbreak Cost-Share	---	25,000	25,000
Fisheries			
Acquisition and Development			
Decorah Hatchery Renovation (FY88 portion only)	375,000	125,000	500,000
Rathbun Hatchery, Intake	93,750	31,250	125,000
Beaver Lake, Land Acq.	37,500	12,500	50,000
Four Lakes, Acquisition	300,000	100,000	400,000
Trout Stream Acquisition	150,000	50,000	200,000
Lake Icaria, Fishing Jetties			

and Sediment Trap	187,500	62,500	250,000
Lake Icaria, Rip-Rap	---	100,000	100,000
Big Creek Fishing Pier	75,000	25,000	100,000
Unspecified Lakes, Habitat Improvement	37,500	12,500	50,000
Marble Beach, Fishing Cleaning Station	18,750	6,250	25,000
Lake Manawa, Fish Cleaning Station	18,750	6,250	25,000
Guttenberg Boat Harbor Renovation-Hatchery	---	80,000	80,000
Blackhawk Lake, Fish Barrier	15,000	5,000	20,000
Spirit Lake, Fish Barrier	15,000	5,000	20,000
Fairport Hatchery, Design, Holding Facility	26,250	8,750	35,000
Decorah Hatchery, Renovate Office Bldg.	---	40,000	40,000
Spirit Lake Hatchery, Security Fence	---	8,000	8,000
Total	1,350,000	678,000	2,028,000
TOTAL, ALL	\$1,740,000	1,810,000	3,550,000

Additional projects will be cost-shared when possible. The amount budgeted for the Decorah Hatchery Renovation relates only to the estimated work to be accomplished in FY88. The remainder of the work will be reflected in the FY89 budget. However, the DNR intends to let the contracts for all the work at the same time, and not split contracts in each fiscal year.

The above listing may be revised extensively depending upon state and federal revenue estimates relating to these projects to be completed this summer.

**IOWA DEPARTMENT OF NATURAL RESOURCES
FISH AND WILDLIFE TRUST FUND, CAPITAL IMPROVEMENTS
FY89**

Project Description	Fed Aid	State	Total
Wildlife Habitat Program			
State Habitat Acquisition	\$ ---	\$ 210,000	\$ 210,000
Habitat Enhance Cost-Share	---	100,000	100,000
Property Taxes, State	---	40,000	40,000
County Cost-Share Program	---	350,000	350,000
Total	---	700,000	700,000
Waterfowl Program			
Lake Odessa, Water Control Structures	---	50,000	50,000
Fallow Marsh, Water Control Structure	---	8,000	8,000
Green Island Levee Rip-Rap Klum Lake, Water Control Structure	37,500	12,500	50,000
Cone Marsh, Water Control Structure	---	7,000	7,000
Otter Creek, Water Control Structure	---	4,000	4,000
D.U. Habitat Grant	---	30,000	30,000
Waterfowl Habitat Acquisition, Unspecified Locations	127,500	42,500	170,000
D.U. Marsh Acq and Dev	63,750	21,250	85,000
Total	228,750	182,250	411,000
Wildlife Area Development			
Bays Branch, Storage Bldg	---	17,000	17,000
Tyrone Area, Fence	---	8,000	8,000
Fox Hills, Fence	---	7,000	7,000
Klum Lake, Road Resurface	---	7,000	7,000
Ryan Lake, Fence	---	10,000	10,000
East Swan Lake, Fence	---	8,000	8,000
Total	---	57,000	57,000
Non-Game Program	---	25,000	25,000
Fisheries			
Acquisition and Development			
Decorah Hatchery Renovation, (Continued from FY88)	975,000	325,000	1,300,000
Beaver Lake Dam	450,000	150,000	600,000
Lake MacBride Fishing Jetties	45,000	15,000	60,000
Lake Darling Fishing Jetties	45,000	15,000	60,000
Lake Manawa Fishing Pier	37,500	12,500	50,000
McIntosh Woods, Fish Cleaning Station	18,750	6,250	25,000
Bussey Lake, Fish Cleaning Station	22,500	7,500	30,000
Little Sioux River, Silver Access, Fishing Riffle	7,500	2,500	10,000
Henderson Park, Raccoon River,			

IOWA DEPARTMENT OF NATURAL RESOURCES
Marine Fuel Tax Fund Recapitulation
FY88 Budget and FY89 Request

Sources of Funds:	Est. Act. FY87	Budget FY88	Request FY89
Balance Forward	2,353,175	1,701,213	1,599,034
Reversions	432,374	--	--
Federal Aid	--	424,000	--
Receipts	1,811,900	1,820,000	1,820,000
Total Available	4,597,449	3,945,213	3,419,034
Uses of Funds:			
Fish and Wildlife, Law Enf and access maintenance	100,000	100,000	150,000
Parks, Water & Boating Related Operations	397,000	397,000	430,000
Capital Acq. & Development	2,399,236	1,849,000	1,800,000
Total Uses	2,896,236	2,346,179	2,380,000

The Marine Fuel Tax fund is supported by gas tax paid by Iowa's boaters, legislatively determined to be 9/10ths of one percent of all gas tax receipts. Sec. 324.79 allows the revenue to be used for Iowa's recreational boating program including acquisition, development and maintenance of boating related facilities, renovation of natural lakes, etc. As shown above, some of the revenue is used to supplement normal operating budgets for law enforcement, parks, and access maintenance. Normally, the General Assembly appropriates the funds used for supplementing operating budgets, and allows the DNR to spend the remainder of the receipts for various capital acquisition and development projects.

**IOWA DEPARTMENT OF NATURAL RESOURCES
MARINE FUEL TAX CAPITAL PROJECTS
FY88**

Project Description	Amount
1. Meadow Lake Boat Ramp, Adair County	\$ 20,000
2. Frasier Boat Ramp, D.M. River, Boone County	20,000
3. Plainfield Access, Boat Ramp, Cedar River Bremer Cty	20,000
4. Troy Mills, Boat Ramp, Buchanan County	10,000
5. Lost Island Lake-Barranger Slough, Water Control Structure, Clay County	100,000
6. Volga River, Grannis Creek Canoe Access, Fayettee Cty	10,000
7. Springbrook Boat Ramp, Raccoon River, Guthrie Cty	20,000
8. Boone Forks, Boone River Boat Ramp, Hamilton Cty	20,000
9. Crystal Lake, Boat Ramp/Jetty, Hancock Cty	25,000
10. Rock Creek Park, Boat Ramp/Jetty, Jasper Cty	25,000
11. Lake MacBride, Boat Ramp, Johnson Cty	20,000
12. Miami Lake, Boat Ramp, Monroe Cty	30,000
13. Viking Lake Park, Boat Ramp, Montgomery Cty	20,000
14. Silver Lake, Boat Ramp, Palo Alto Cty	25,000
15. LeClaire Access, Boat Ramp, Mississippi River, Scott Cty	35,000
16. Helmke Access, Canoe Access, Boone River, Wright Cty	10,000
17. Lakeside Demolition, Storm Lake, Buena Vista Cty	10,000
18. Diamond Lake Access Road, Dickinson Cty	20,000
19. Elk Lake Water Control Structure, Clay Cty	20,000
20. McKain's Access, Rip-Rap Ramp, Skunk River, Washington Cty	5,000
21. 12 Mile Lake Boat Ramp, Emmett Cty	20,000
22. Hardfish Access, Well, Mississippi River, Scott Cty	1,000
23. Heytman's Boat Channel Clean-out, Mississippi River, Allamakee Cty	8,000
24. Blue Lake, East Access Boat Ramp, Monona Cty	35,000
25. Minburn Access, Hiway 31 Boat Ramp, Raccoon River, Dallas Cty	20,000
26. Saylorville WMA Boat Ramp, Des Moines River, Dallas Cty	45,000
27. Templar Point, Double Ramp and Parking, Spirit Lake, Dickinson Cty, (See Lottery Projects Also)	130,000
28. Correctionville Boat Ramp, Little Sioux River, Woodbury	25,000
29. Water Access Acquisition, unspecified locations	200,000
30. Water Access Acquisition and Development, Local Gov't Cost-Share program	600,000
31. Water Access Renovation, Minor Projects	100,000
32. Project Design & Contract Administration	200,000
TOTAL	\$1,849,000

Qualified access projects will be cost-shared with federal boating safety funds when possible.

IOWA DEPARTMENT OF NATURAL RESOURCES
MARINE FUEL TAX CAPITAL PROJECTS
FY89

Project Description	Amount
1. Unspecified construction of new boat ramps, replacement or renovation of existing ramps, etc.	\$700,000
2. Water Access Acquisition, unspecified sites	200,000
3. Water Access Acquisition and Development, Local Gov't Cost-Share Program	600,000
4. Minor Access Renovation projects	100,000
5. Project Design & Contract Administration	200,000
TOTAL	\$1,800,000

Projects will be cost-shared with Federal Boating Safety funds when available.

IOWA DEPARTMENT OF NATURAL RESOURCES
PARK USER FEE FUND
FY89 BUDGET REQUEST

	Actual FY86	Actual FY87	Budget FY88	Request FY89
Sources of Funds:				
Balance Forward	--	503,010	1,514,196	860,800
Receipts:				
Park User Permits	503,010	1,244,596	1,127,000	958,000
Interest	--	59,238	65,000	40,000
Other	--	6,565	--	--
Total Receipts	503,010	1,310,400	1,192,000	998,000
Total Sources	503,010	1,813,410	2,706,196	1,858,800
Uses of Funds:				
Project Encumbrances	--	--	275,396	--
Project Expenditures	--	299,214	1,570,000	1,480,400
Total Uses	--	299,214	1,845,396	1,480,400

Notes: The above schedule is presented on a strict "cash" basis. The project encumbrances shown in FY88 are obligations incurred in FY87 that will be liquidated in FY88. Project expenditures are shown as projects are budgeted for FY88 and FY89. For ease of presentation, no encumbrances are shown in FY88 and FY89, although it can be reasonably assumed that obligations will exist as of 6-30 of each year. Since the reduction in the cost of the user fee will not occur until the beginning of calendar 1988, a portion of the receipts collected in FY88 during the first half of the fiscal year will be at the old rate, and those collected during the second half will be at the new rate. The estimate of fees to be collected at the new, lower rate is based on the legislative fiscal note projection used by the General Assembly in setting the new, lower rate.

The Park User Fee statute appropriates the fees solely for the renovation and replacement of park and recreation facilities. Thus, the printing cost of the stickers and other administrative costs are included in the operating budget instead of charged against fees. Since the fees are already appropriated in the original statute, no additional appropriation action by the 1988 General Assembly is needed to proceed with the budgeted projects.

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IOWA DEPARTMENT OF NATURAL RESOURCES
PARK USER FEE FUND
FY88

1.	Lewis and Clark Beach Facility	\$ 85,000
2.	SpringBrook Group Camp Renovation	40,000
3.	Lake MacBride Beach Facility/Boathouse	130,000
4.	Lake Wapello Beachhouse Renovation	40,000
5.	Lake Ahquabi Lodge Renovation	40,000
6.	Gull Point Shower & Toilet Building	100,000
7.	Clear Lake Shower & Toilet Building	100,000
8.	Honey Creek Shower & Toilet Building	100,000
9.	Honey Creek Lagoon/Wastewater System Renovation	50,000
10.	Fairport Shower & Toilet Building	150,000
11.	Lake Keonah Campground Latrine	25,000
12.	Lake Keonah Sewage System Renovation	13,000
13.	Trail Construction, Continue Mines of Spain and other park and recreation areas	25,000
14.	Lake Ahquabi Pit Vault Latrine	25,000
15.	Prairie Rose Water System Renovation	75,000
16.	Wapsipinicon Horseshoe Picnic Area Modern Latrine	50,000
17.	Lacey-Keosauqua Shower & Toilet Building	100,000
18.	Lake of Three Fires Water and Wastewater system renovation	150,000
19.	Lake of Three Fires Beachhouse Renovation	50,000
20.	Springbrook Spillway Renovation Design	20,000
21.	Minor Renovation Projects	100,000
22.	Project Design and Contract Administration	100,000
TOTAL		1,570,000

The first five projects and the Mines of Spain trail work are carry-over projects from FY87. The listing does not denote project priority.

IOWA DEPARTMENT OF NATURAL RESOURCES
PARK USER FEE FUND
FY89

1.	Black Hawk Shower & Toilet Building	\$ 100,000
2.	Red Haw Shower & Toilet Building	100,000
3.	Walnut Woods Shower & Toilet Building	100,000
4.	Lacey-Keosauqua Cabin Foundation Renovation	45,000
5.	Geode Campground Electrical System Renovation	20,000
6.	MacIntosh Woods Pit Latrine	25,000
7.	Emerson Bay Modern Latrine	50,000
8.	Springbrook Group Camp Renovation	160,000
9.	Palisades Kepler Shower & Toilet Building	100,000
10.	Lake Wapello Shelter	40,000
11.	Lake Wapello Shower & Toilet Building	100,000
12.	Palisades Kepler Lodge Well Replacement	5,400
13.	Lake Wapello Campground Renovation	170,000
14.	Trail Renovation, unspecified areas	25,000
15.	Green Valley Pit Latrine	25,000
16.	Backbone, Replace Four Cabins	50,000
17.	Big Creek Sewage System Repair	75,000
18.	Green Valley Campground Electrical System	25,000
19.	Red Haw Campground Electrical System	25,000
20.	Nine Eagles Water System Renovation	30,000
21.	Walnut Woods Lodge Water System Renovation	10,000
22.	Minor Renovation Projects	100,000
23.	Project Design & Contract Administration	100,000
TOTAL		\$1,480,400

IOWA DEPARTMENT OF NATURAL RESOURCES
IOWA PLAN (LOTTERY) PROJECTS
FY88 & FY89

FY88 Projects:

PROJECT DESCRIPTION	AMOUNT
1. County Conservation Recreation-Tourism Grants	\$250,000
2. Western Iowa Historical Trails Center (To be used only if matching federal funds are available.)	250,000
3. Green Castle Lake Dam Renovation, Marshall Cty	165,000
4. Maquoketa Caves Park Acquisition	35,000
5. Iowa River Greenbelt Corridor Trail Plan	15,000
6. Backbone State Park CCC Museum	100,000
7. A.A. Call State Park, Renovation Projects	40,000
8. Union Grove Lake Restoration	250,000

The first eight projects were line-itemed by G.A. action. The order listed does not denote a priority recommendation.

Western Iowa Loess Hills Forest, Continue acquisition 400,000
Recreation Area Development:

	LAWCON	
Templar Point	\$74,000	74,000
Lighthouse Point	91,000	91,000
Gull Point	85,000	85,000
Pikes Peak	188,000	188,000
Project Contingencies		57,000

TOTAL FY88 Lottery Projects 438,000 2,000,000

The proposed LAWCON cost-share is dependent upon Congressional action : the above state projects being selected through the State Open Project Selection process. Thus, the availability of the cost-share funds will be in doubt until this coming winter. The lottery revenue amount of \$2,000,000 is contingent upon sufficient lottery receipts.

FY89 PROJECTS--REQUEST

Project Description

1. Continue Western Iowa Forest Acquisition	400,000
2. County Recreation and Tourism Grants	750,000
3. Public Private Cost-Share Projects	250,000
4. State Park and Recreation Area Development and Redevelopment as follows:	
a. Complete FY88 State development Projects as listed above due to projected revenue shortfall. (Projected shortfall is \$400,000. Currently awaiting legal advice regarding how to assign the shortfall.)	329,000
b. Geode Park Water System Improvements	450,000
c. Maquoketa Caves Park, Redevelopment and Erosion Control Structures in Watershed	350,000

d. Mines of Spain Recreation Area, Initial Development, Roads, etc.	1,000,000
e. Brushy Creek Recreation Area, Dam Design and First Phase Construction; Facilities	2,000,000
f. Volga River Recreation Area, Continue Development; Water, Sewer, Campground, etc.	1,000,000
g. Wilson Island Recreation Area, Water and Waste System Improvements	400,000
h. Cedar Falls-Waterloo, Connect George Wyth bike trail link	50,000
Total--FY89 Lottery Project Request	7,017,000

This proposal moves all of the park and recreation development and redevelopment requests from a combination of Lottery funds and General Fund funding to all Lottery funding. While the above request is for FY89, under the current lottery funding approach, appropriated funds do not revert at the end of the fiscal year if not obligated. Thus, if appropriated per current practice, the above funding would remain for the duration of the project or funds even if the contracting process required more than one year. The original intent of the Lottery appropriation for state park and recreation area development was to encourage additional tourism and recreation activities as a means of generating additional economic activity. The above projects fit that original intent.

IOWA DEPARTMENT OF NATURAL RESOURCES
General Fund Capitals
FY88 and FY89

FY88

Project Description	Amount
Pine Lake State Park, Aerial Topography and Engineering Study to determine the feasibility of increasing the height of the Dam/s to provide larger and deeper lake/s. This would be an alternative to the currently designed dam renovation projects which provide for renovating the dams to meet dam safety standards, but do not change the character of the lakes.	\$40,000

FY89 Request

1. Preserves Acquisition. This allows for state acquisition of unique areas	150,000
2. Boone River Protected Water Area Acquisition	200,000
3. Springbrook Park Dam Renovation	250,000
4. State Forests, operations and maintenance facilities, shop and storage buildings at Yellow River and Shimek; chemical storage facilities at Stephens and the Nursery	122,000
5. State Parks and Recreation Areas, Pleasant Creek Residence and Visitor Center, Stone Park Residence and Garage Renovation	175,000
6. Pine Lake Dams Renovation. (If the feasibility study results in a recommendation to increase the height of the dams and redevelop the park, these funds would be used for the initial work.	1,800,000
Total General Fund Capitals Request	\$ 2,697,000

The request from the General funds includes those high priority projects of the DNR that do not fit within the legislative intent within the various earmarked sources of funding.

ASSOCIATION ASSESSMENTS

The DNR represents the state's interest in two multi-state organizations. Each requires annual assessments from the involved states to support the associations. The DNR is requesting a separate General fund appropriation to support each association.

1. Low-Level Radioactive Waste Compact.

\$78,000 is requested to meet Iowa's assessment for FY89. The FY88 assessment, requested as a supplemental appropriation, is \$60,600. The FY87 assessment was \$45,000. The FY90 assessment is expected to be approximately \$170,810. These increases reflect the cost of choosing the initial disposal site.

2. Mississippi River Basin Association.

\$35,000 is requested for the FY88 membership assessment to the basin association. \$35,000 was also requested as a supplemental appropriation for FY87 costs.

GROUNDWATER BUDGET
Budget FY88 and FY89

H.F. 631 sets up a separate Groundwater fund. Within this fund are five accounts: (1) Oil Overcharge Account, (2) Agricultural Management Account, (3) Solid Waste Account, (4) Storage Tank Management Account, and (5) the Household Hazardous Waste Account. The receipts to each account and the expenditures from each account are shown as mandated by H.F. 631.

Many of the receipt estimates are based on limited data, and it may be necessary to make significant changes as better information is received. For the most part, the DNR has little discretion among the various expenditure purposes appropriated from each account.

The budget anticipates that 65 positions are necessary to handle the Groundwater program. Forty three of these are new and additional positions, and the remainder represent existing positions (FY87) to also be funded with Groundwater monies. The addition of this staffing is explained, by division, in the narrative relating to the various divisions found elsewhere in this document.

IOWA DEPARTMENT OF NATURAL RESOURCES
AGRICULTURAL MANAGEMENT ACCOUNT
Budget, FY88, FY89 & FY90

Sources of Funds	FY88	FY89	FY90
Balance Forward	--	76,790	--
Fertilizer Tonnage Fees	240,000	750,000	750,000
Pesticide Sales Fees	--	323,000	323,000
Pesticide Registration Fees	1,500,000	1,500,000	1,500,000
Total Sources	1,740,000	2,649,790	2,573,000
Uses of Funds			
To Dept. of Public Health	9,000	9,000	9,000
To U. of I., Center for Health Effects	79,000	237,671	230,760
To the Leopold Center	605,850	924,277	897,400
To the DNR:			
1. Admin GW Grants to Counties			
2. Oversight of Cty Programs Relative to Well Testing and Closure (both purposes)	34,620	52,816	51,280
To the DNR for Grants to Counties for Testing Private, Rural Wells, and Water Supplies	398,130	607,382	589,720
To the U.H.L for Testing Private, Rural Wells	103,860	158,447	153,840
To the DNR for Grants to Counties for Closing Abandoned Rural Wells	207,720	316,895	307,680
To DALs for Financial Incentives, Studies, Research, and Admin. Costs Related to Ag Drainage Wells and Sinkholes	175,030	343,302	333,320
To the DNR for Grants to Cty Conservation Boards Regarding Alternative Roadside Vegt. Management	50,000	--	--
Balance Forward	76,790	--	--
Total Uses	1,740,000	2,649,790	2,573,000

Notes: The revenue amounts are based on estimates provided by staff in DALs familiar with the fertilizer and pesticide programs. H.F.631 also

provides that fines related to unplugged wells are credited to this account and are to be added to the DAIS financial incentives program to reduce a person's cost in properly plugging an abandoned well abandoned prior to July 1, 1987. This amount is expected to be minimal and is not reflect in the above schedules. With some exceptions, the funds are appropriated in terms of percentages with "not more than" language. As a practical matter, if funds are budgeted at less than the specified percentage, the difference would have to be carried forward. The amounts appropriated in this account, with some exceptions, depend upon actual receipts. These receipts will be credited to the account in an uneven stream throughout the year. Thus, the total amount available for each purpose will not be known with certainty until all receipts are credited to the account at June 30 of each year.

IOWA DEPARTMENT OF NATURAL RESOURCES
HOUSEHOLD HAZARDOUS WASTE ACCOUNT
Budget, FY88, FY89 & FY90

Source of Funds	FY88	FY89	FY90
Retailer Permit Fees	200,000	200,000	200,000
Uses of Funds			
To Dept. of Public Health	2,000	2,000	2,000
To IDOT, Used Oil Project	8,000	--	--
To DNR for Grants to Service Organizations for Recycling and Reclamation Events	10,000	35,000	35,000
To DNR for: Toxic Clean-Up Days	110,000	93,000	93,000
Education Programs, Booklets, etc & Administrative Costs	20,000	20,000	20,000
To DRF for Administration of the Permit Program	50,000	50,000	50,000
Total Uses	200,000	200,000	200,000

Notes:

Revenue Estimate: DRF has collected \$100,000 to date from approximately 9,000 retailers. Response to the initial mailing by DRF has dropped to "next to nothing." Additional retailers will probably respond when the DNR clearly defines the term "hazardous household waste." On the other hand if the requested A.G's opinion states that "gross retail sales" applies only to hazardous products, revenue might decrease significantly.

H.F. 631 appropriates \$80,000 to service organizations for recycling and reclamation events without specifying the time period. Since the bill also allows "up to" \$80,000, less could be budgeted or spent. This schedule arbitrarily spreads the appropriation at the full amount over three years.

Toxic Clean Up Days: H.F. 631 establishes a goal of 12 days in FY88. Based on the two days experience in FY87, the budgeted funds will be enough for only two or three days. This could be increased if receipts exceed the above estimate. The converse might also be necessary.

DRF Administrative Costs: H.F. 631 appears to allow DRF to simply recover the full cost of administrating the permits and collecting the revenue. Their initial estimate was \$75,000 last spring, and an up-to-date, accurate estimate has not net been prepared. If their cost is higher than the budget estimate, the budget for one or more of the other categories would have to be reduced accordingly.

IOWA DEPARTMENT OF NATURAL RESOURCES
OIL OVERCHARGE ACCOUNT, GROUND WATER PROTECTION
Budget, FY88, FY89 & FY90

Source of Funds	FY88	FY89	FY90
Appropriations from Oil Overcharge Settlements	5,500,000	4,000,000	3,000,000
Uses of Funds			
To DNR for all of the following:			
1. Groundwater monitoring network			
2. Contaminant report			
3. Non-regulated contaminant report			
4. Groundwater hazard mapping			
5. Groundwater quality information and data dissemination			
6. Geographic information data system & water resource data system			
7. Groundwater program evaluation			
8. Investigatory and enforcement action			
9. Groundwater data dissemination			
(All Purposes)	860,000	650,000	600,000
To DNR for assessing rural, private water supply water quality	560,000	--	--
To DNR for admin. of GW monitoring program at landfills	100,000	100,000	--
To DNR to develop and implement demonstration projects for landfill alternatives to solid waste disposal including recycling programs	760,000	850,000	--
To IWSWRI for grants regarding alternative disposal methods and GW protection	120,000	100,000	100,000
To the Leopold Center	800,000	--	--
To DALS for the AEMF to improve farm mngt practices relative GW purposes	1,500,000	1,500,000	1,500,000
To DNR for the Big Springs project	700,000	700,000	700,000

To DALS for education program related to drainage wells and sinkhole management	100,000	100,000	100,000
Total, All Uses	5,500,000	4,000,000	3,000,000

7-7

IOWA DEPARTMENT OF NATURAL RESOURCES
STORAGE TANK MANAGEMENT ACCOUNT
Budget, FY88, FY89 & FY90

Source	FY88	FY89	FY90
Balance Forward	142,900	--	--
Annual Tank Fees	420,000	420,000	420,000
New Tanks, Late Fees, etc.	10,000	10,000	10,000
Total	572,900	430,000	430,000
Uses:			
To Dept. of Public Health	1,000	1,000	1,000
To Ins. Division for Operations Plan	25,000	--	--
To DNR:			
Storage Tank Program Administration	100,000	100,000	100,000
For Programs which reduce potential for harm to environment and health	301,030	201,000	201,000
To DNR for State Remedial Clean-up Efforts	145,870	128,000	128,000
Total	572,870	430,000	430,000

Note: The above allotment to DNR for program administration and for programs which reduce potential, etc, is appropriated as one sum for each year. Therefore, the DNR can adjust funding between those two purposes. The above allocation between those purposes is arbitrary at this point, and will be revised pending the development of a detailed budget for both of those purposes.

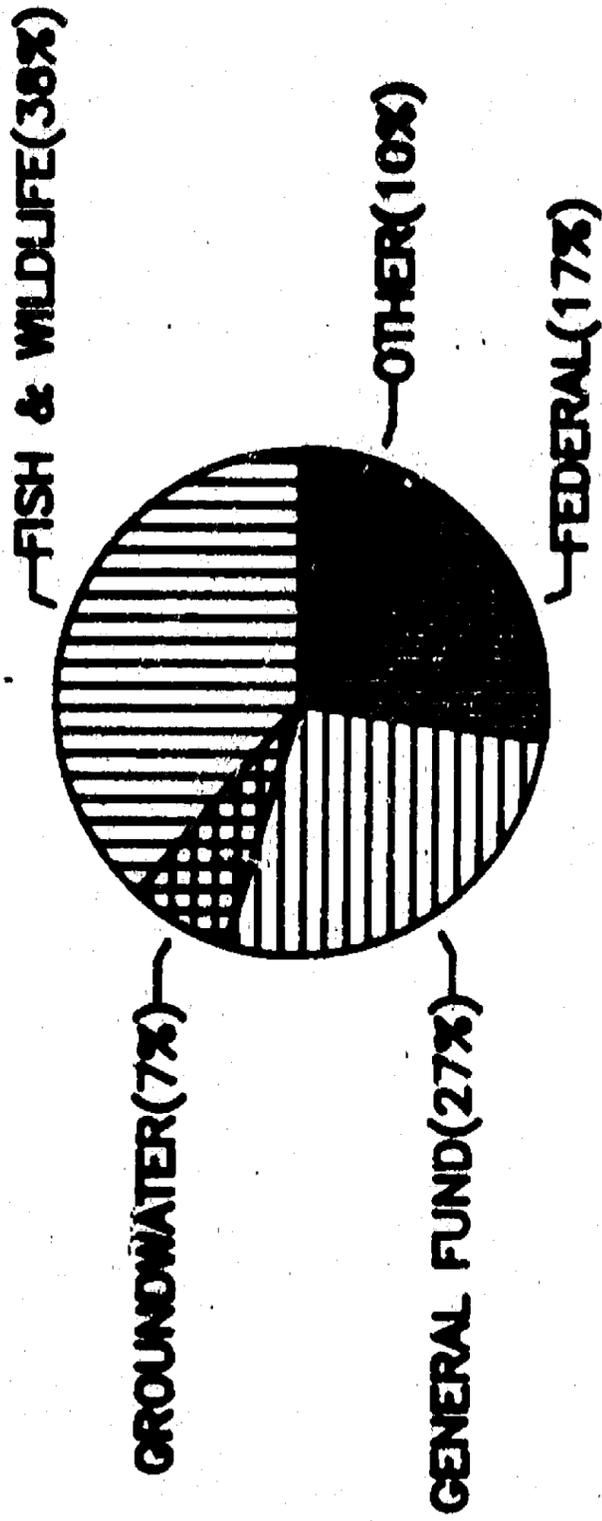
IOWA DEPARTMENT OF NATURAL RESOURCES
SOLID WASTE ACCOUNT
Budget, FY88, FY89 & FY90

Sources	FY88	FY89	FY90
Balance Forward	409,938	--	--
Tonnage Fees	--	1,600,000	2,400,000
Total	409,938	1,600,000	2,400,000
Uses			
WMAD appropriation, first 6 cents	98,385	96,000	96,000
UNI, Technology Center	50,000	224,000	224,000
Development of guidelines for GW monitoring at Sanitary Disposal projects	261,552	280,000	280,000
To D.P.H.		8,000	8,000
Abatement and Cleanup of threats to public health & safety from sanitary landfills if operator is unable to do so.		192,000	192,000
Demonstration Projects for landfill alternatives to solid waste disposal.		800,000	1,600,000
Total	409,938	1,600,000	2,400,000

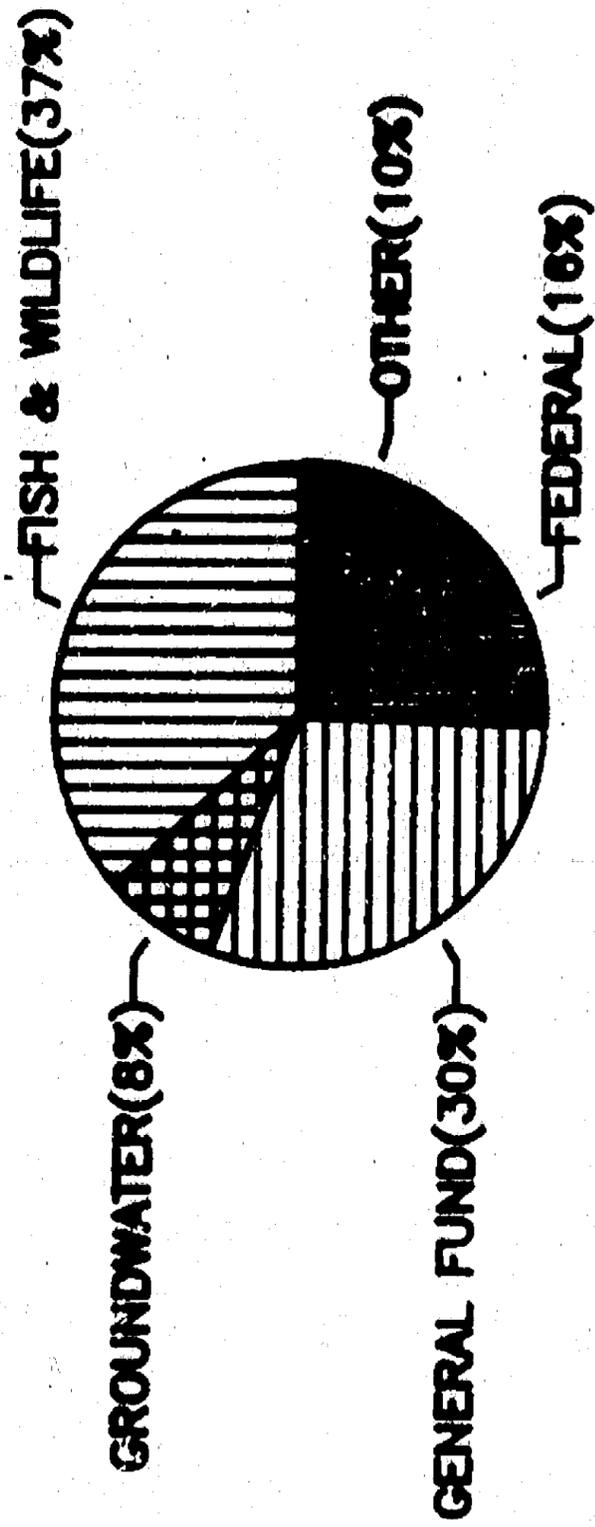
Additional retainage by
landfill operators from
tonnage fee. 800,000 800,000

Note: Whether or not H.F.631 requires landfills to pay a 25 cent fee per ton in FY88 has been challenged. However, H.F. 631 also does not appear to appropriate the FY88 fees if they are collected. Thus, the \$400,000 that will be collected in FY88, assuming the challenge is not successful, is not reflected in the above schedule.

DEPARTMENT OF NATURAL RESOURCES FY 88 SOURCES OF FUNDING (OPERATIONS)

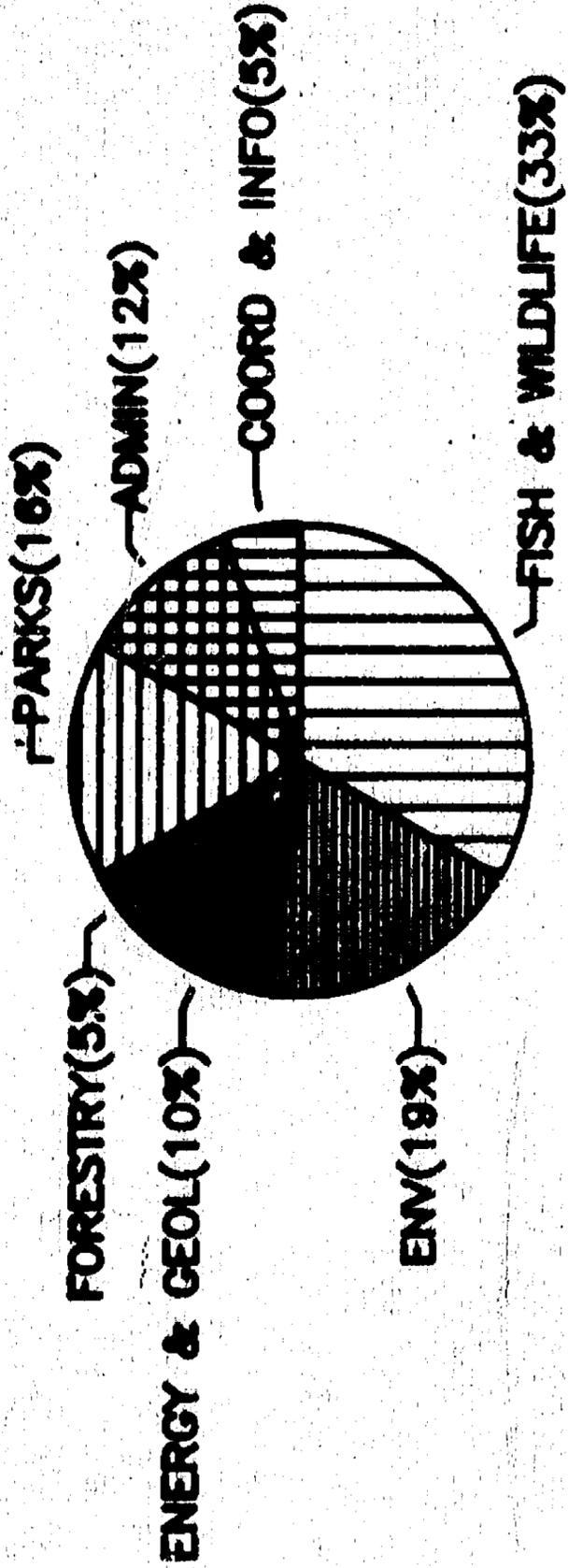


DEPARTMENT OF NATURAL RESOURCES FY 89 SOURCES OF FUNDING (OPERATIONS)



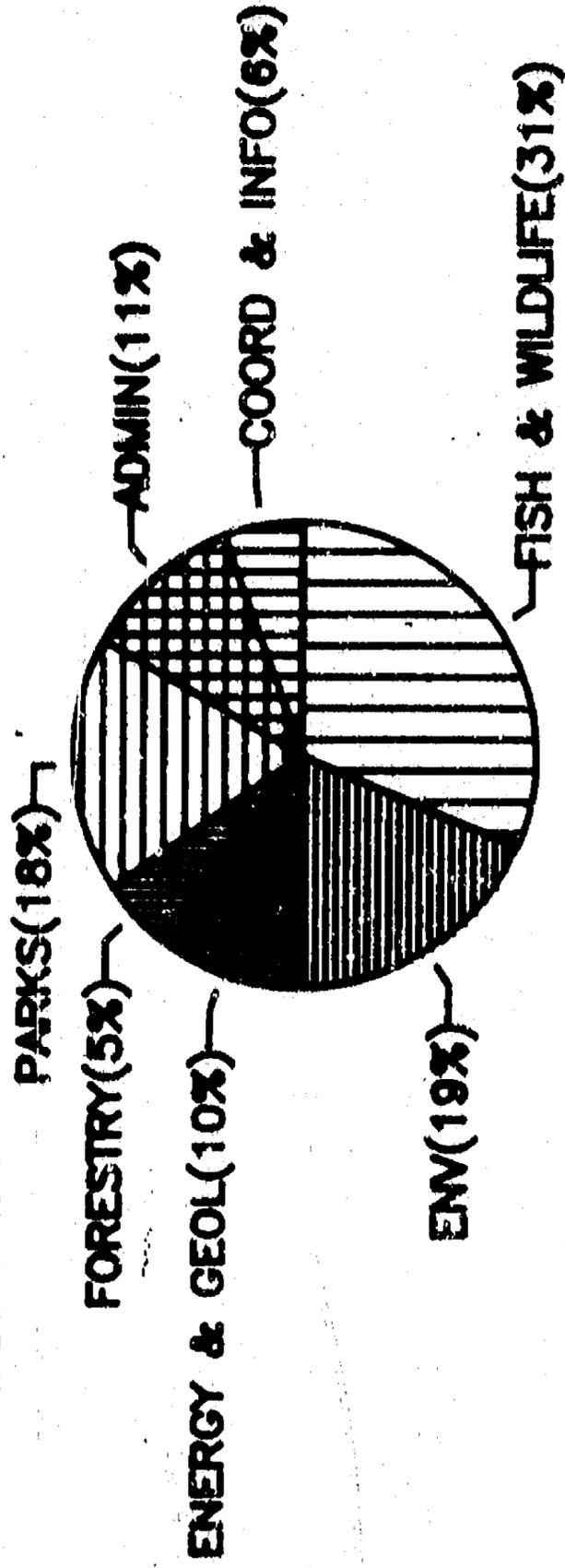
DEPARTMENT OF NATURAL RESOURCES

FUND DISTRIBUTION FY88 BY DIVISION

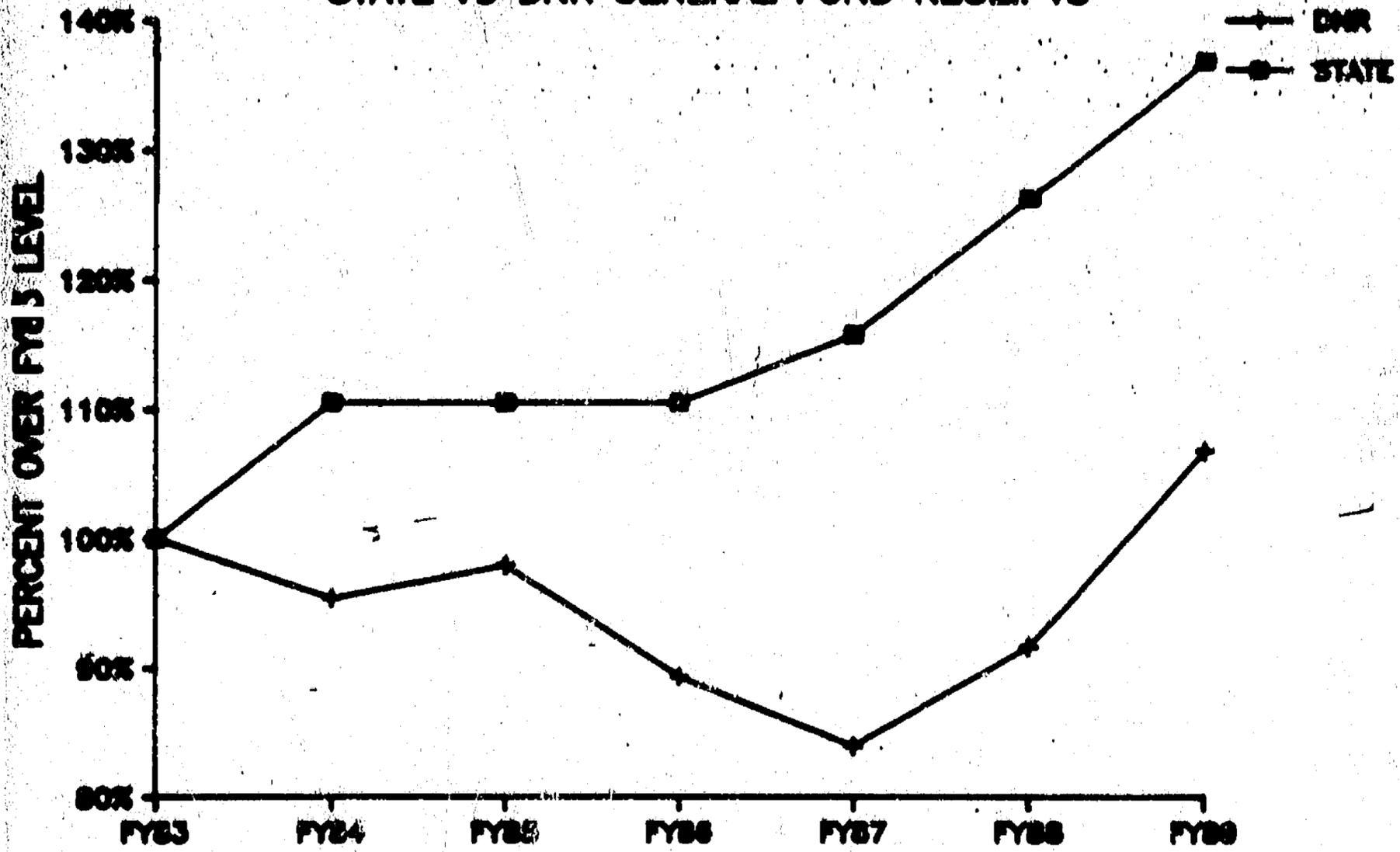


DEPARTMENT OF NATURAL RESOURCES

FUND DISTRIBUTION FY89 BY DIVISION



DEPARTMENT OF NATURAL RESOURCES STATE VS DNR GENERAL FUND RECEIPTS



ENVIRONMENTAL PROTECTION COMMISSION

ITEM 5

DECISION

NEW OFFICE LEASE--REGIONAL OFFICE #2--FIELD EVALUATION AND EMERGENCY RESPONSE BUREAU

The Environmental Protection Commission will be requested to approve a new office lease for Regional Office #2 of the Field Evaluation and Emergency Response Bureau located in Mason City, Iowa.

The current lease expires November 30, 1987, and can be renewed for one year only. Current rent being paid is \$7.53/ft². This is subject to annual escalation based on utilities and tax increases based on 1977. The size of the office is 1223 ft² and is located at 505 and 509 South President. All amenities are supplied at this cost. Parking at the current address is limited, and handicapped access is inconvenient. Because of the above, it was felt that a new location should be considered.

A total of 20 locations were considered with prices ranging from \$5.40 to \$8.00 per ft². Of the 20 considered, four were physically inspected, and the one offered for approval is the one selected.

The office presented is 1632 ft² with a complete cost of \$5.40 ft² or \$8812.80 annually. This compares with the current cost of \$9578.16. The new location offers complete handicap access, 19-car parking space, and a five-year lease with no escalation clause. All amenities are provided including snow removal, janitorial supplies, and waste pick-up. On-site overnight parking for state vehicles is also included. The location provides quick access to Interstate 35 and State Highway 18.

John Beamer
October 29, 1987

(I25.MIN/sc)

ENVIRONMENTAL PROTECTION COMMISSION

ITEM 6

DECISION

ANNUAL COMPUTER USAGE AGREEMENTS WITH THE U. S. ENVIRONMENTAL PROTECTION AGENCY

The Department annually enters into computer agreements with the U. S. Environmental Protection Agency (EPA) for computer time on various established EPA data systems. Such access provides the Department with data and data handling services by paying only for computer time thus saving programming and data storage costs. Below is a listing of all data systems and costs for agreement renewal. All agreements listed would be renewed for the period 10/1/87 - 9/30/88. Some of the systems listed are used at no cost to the agency. They are funded through a credit from EPA.

<u>Data System</u>	<u>Cost to DWR</u>	<u>EPA Credit</u>	<u>Total Cost</u>
1. Model State Information System (MSIS)	\$ 10,000	\$ 0	\$ 10,000
2. Compliance Data System (CDS)	6,000	0	6,000
3. Air Quality Modeling System (AQMS)	2,000	0	2,000
4. Water Quality Storage and Retrieval System (STORET)	0	4,000	4,000
5. Emissions Inventory Systems (EIS) and Air Quality Data Handling System II (AQDHSII)	0	20,000	20,000
6. National Emissions Data System (NEDS)	0	Unlimited	Unlimited
7. Storage and Retrieval of Aerometric Data System (SAROAD)	0	Unlimited	Unlimited
Total Costs	\$ 18,000	\$ 24,000	\$ 42,000

Background:

The costs are maximum limits. Actual costs will be based on actual computer time used. Below is a listing and description of each system.

1. Model State Information System (MSIS): Processes water supply analytical data (bacteriological, chemical and radiological) to monitor compliance with the Safe Drinking Water Act. MSIS also assists the Department in complying with annual federal reporting requirements.
2. Compliance Data System (CDS): Processes point source emission data and events to assist the Department in tracking enforcement activities and meeting federal reporting requirements.

3. Air Quality Modeling System (AQMS): Allows the Department access to a number of EPA air quality modeling systems as needed. These modeling systems allow the Department to simulate air pollution situations and obtain potential air contaminant information which would result from the situation.
4. Water Quality Storage and Retrieval System (STORET): Collects water quality data which is used by the Department in monitoring stream quality and developing waste load allocations and water quality standards.
5. Emissions Inventory System (EIS): EPA has hired a contractor to assist the Department in building an Emissions Inventory System. The Clean Air Act requires that an emission inventory be maintained.

Air Quality Data Handling System II (AQDHSII): Processes ambient air quality and meteorological data collected from various sites throughout the state for various pollutants. Detail and summary reports are generated by site and monitoring parameter on a monthly basis which compare results with state and federal standards to assist the Department in monitoring and controlling atmospheric pollution. EPA requires that Iowa provide them with the data in this system.

6. National Emissions Data System (NEDS): This system will be used by the Department to estimate total emissions from point source emissions survey data.
7. Storage and Retrieval of Aerometric Data System (SAROAD): Processes ambient air monitoring data from the AQDHSII system and produces monthly and quarterly detail and summary reports. The system is run in parallel with AQDHSII producing statistics which correspond to state and federal standards that AQDHSII does not produce.

Stan Kuhn

(I10)

ENVIRONMENTAL PROTECTION COMMISSION

ITEM

7

INFORMATIONAL

MONTHLY REPORTS

The following monthly reports are enclosed with the agenda for the Commission's information.

1. Rulemaking Status Report
2. Variance Report
3. Hazardous Substance/Emergency Response Report
4. Enforcement Status Report
5. Contested Case Status Report

Members of the department will be present to expand upon these reports and answer questions.

Allan Stokes
November 2, 1987

IOHA DEPARTMENT OF NATURAL RESOURCES
 ENVIRONMENTAL PROTECTION COMMISSION
 RULEMAKING STATUS REPORT
 NOVEMBER 1, 1987

PROPOSAL	DRAFT TO COMMISSION	NOTICE PUBLISHED	RULES REVIEW COMMITTEE	HEARING	SUMMARY OF COMMENTS & RECOMMENDATIONS TO COMMISSION	RULES ADOPTED	RULES PUBLISHED	RULE EFFECTIVE
1. Ch. 25 - NPS & NEMAPS	10/22/87	11/18/87		12/09/87 12/10/87 12/11/87				
2. Ch. 38 Private Well Construction Permit	11/17/87							
3. Ch. 91 - Construction Grants	10/27/87	11/18/87		12/08/87				
4. Chs. 100, 102 - Liquids in Landfills	10/20/87	11/18/87		12/09/86 12/10/87 12/11/87				
5. Ch. 102 Sewage Sludge at Landfills	11/17/87	*12/16/87						
6. Chs. 100, 103 Landfill Ground Water Monitoring	10/20/87	11/18/87	2/10/87	12/09/87 12/10/87 12/11/87				
7. Ch. 135 - Sniffer Well Criteria	10/20/87	11/18/87		12/09/87 12/10/87 12/11/87				
8. Ch. 143 - Used Oil	6/17/87	8/12/87		9/08/87 9/09/87 9/10/87	10/20/87	10/20/87	11/18/87	12/23/87
9. Ch. 144 - Household Hazardous Materials	11/17/87	-		-	-	*11/17/87	*12/16/87	*11/17/87
10. Ch. 152 - Criteria for Siting Low-Level Radioactive Waste Facilities	8/19/87	9/09/87	10/13/87	10/01/87 10/02/87 10/06/87	11/17/87	*11/17/87	*12/16/87	* 1/20/88

*Projected

MONTHLY VARIANCE REPORT

10/31/87

No. Facility	Program	Engineer	Subject	Decision	Date
1 Klemm, City of	Wastewater Const.	Wallace, Holland	Lagoon Shape	approved	10/12/87
2 IDP, Inc.-Storm Lake	Wastewater Const.	IDP, Inc.	Activated Sludge Design Basis	approved	10/21/87
3 Miles, City of	Watersupply Const.	IIM Associates	Construction Materials	approved	10/12/87

REPORTS OF HAZARDOUS CONDITIONS

During the period of October 1, 1987 through October 31, 1987, reports of 69 hazardous conditions were forwarded to the Central Office. Two incidents are highlighted, followed by a general summary and the number per field office.

Date Reported and County	Description: Material, Amount, Date of Incident, Cause, Location, Impact	Responsible Party	Response and Corrective Actions
10/19/87 KOSSUTH	A site gauge hose broke and allowed about 5,000 gallons of 28% nitrogen fertilizer to leak through an open valve in Fenton, Iowa on October 17, 1987.	Fenton Coop Elevator Box 110, Fenton, Iowa 59539	Contaminated soils were scraped up and applied on land at normal rates of application.
10/28/87 DALLAS	Two storage tanks were being filled with diesel fuel when a closed valve between the tanks caused about 1,000 gallons to overflow the first tank in Booneville, Iowa on October 27, 1987.	Farmland Industries 1661 East Aurora, Des Moines, Iowa 50316	Contaminated soils were excavated, applied on land, and turned to enhance aeration and biodegradation.

Numbers in Parentheses Represent Reports for the Same Period in Fiscal Year 1987

Month	Substance Type							Mode			
	Total # of Incidents	Petroleum Product	Agri. Chemical	Other Chemicals and Substances	Handling and Storage	Pipeline	Highway Incident	RR Incident	Fire	Other	
Oct	59 (79)	47 (45) UST-21	4 (0)	18 (34)	53 (53) UST-21	0 (0)	9 (18)	1 (2)	2 (0)	4 (6)	

Total # of Incidents Per
 Field Office 01 02 03 04 05 06
 This Period 15 11 3 10 21 9

bhp/ER1216P01.01

DATE: November 2, 1987

TO: EPC

FROM: Mike Murphy

RE: Enforcement Report Update

The following new enforcement actions were taken last month:

Name, Location and Field Office Number	Program	Alleged Violation	Action	Date
Sky Line Inn Dubuque (F.O. 1)	Water Supply	Sample for nitrate	Penalty/ Order	10/05/87
Donald Ranslow, Grand Junction (4)	Underground Tanks	Submit and implement investigation and remediation plan failure to monitor	Order	10/05/87
Des Moines Asphalt Des Moines (5)	Air Quality	Failure to notify of relocation	Order/ Penalty	10/05/87
Cutty's of Okoboji Spirit Lake (3)	Drinking Water	Monitoring and reporting bacteria	Order/ Penalty	10/07/87
City of Lynnville (5)	Water Use	Permit	Order/ Penalty	10/07/87
Arlene's Cafe, Turin (4)	Drinking Water	Monitoring and reporting bacteria	Order/ Penalty	10/07/87
Viking Gallery, Ltd. Vinton (1)	Drinking Water	Monitoring and reporting bacteria	Order/ Penalty	10/07/87
Hartman's Riverside Camp #1 Harpers Ferry (1)	Drinking Water	Monitoring and reporting bacteria	Order/ Penalty	10/07/87
Follett's Tap Camarache (6)	Drinking Water	Monitoring and reporting bacteria	Order/ Penalty	10/07/87

MN:bag/CIM306L02.01

DATE: November 2, 1987

TO: KPC

FROM: Mike Murphy

RE: Enforcement Report Update

The following new enforcement actions were taken last month:

Name, Location and Field Office Number	Program	Alleged Violation	Action	Date
Dale Goodale Osage (2)	Solid Waste	Open dumping	Order	10/07/87
John K. Hanson, Winnebago Industries Forest City (2)	Solid Waste	C & D site	Order/ Penalty	10/12/87
Stanley Moser, Hudson (1)	Solid Waste	Open dumping	Order/ Penalty	10/12/87
City of Earlville (1)	Water Rights	No permit application	Order/ Penalty	10/16/87
City of Sheldahl (5)	Drinking Water	Radioactivity	Order/ Penalty	10/16/87
City of Montour (5)	Drinking Water	Radioactivity	Order/ Penalty	10/16/87
City of Ferguson (5)	Drinking Water	Radioactivity	Order/ Penalty	10/16/87
Kimballton Utilities (4)	Drinking Water	Radioactivity	Order/ Penalty	10/16/87
Shiloh, Kalona (6)	Drinking Water	Failure to monitor nitrates	Order/ Penalty	10/16/87
Cotter Elementary School Columbus Junction (6)	Drinking Water	Failure to monitor nitrates	Order/ Penalty	10/16/87
St. Cecilia - St. Joe School Bode (2)	Drinking Water	Failure to monitor nitrates	Order/ Penalty	10/16/87
City of Arcadia (4)	Drinking Water	Radioactivity	Order/ Penalty	10/16/87
City of Hornick (3)	Drinking Water	Radioactivity	Order/ Penalty	10/16/87

DATE: November 2, 1987

TO: EPC

FROM: Mike Murphy

RE: Enforcement Report Update

The following new enforcement actions were taken last month:

Name, Location and Field Office Number	Program	Alleged Violation	Action	Date
City of Swan (5)	Drinking Water	Organics Monitoring and Reporting	Order/ Penalty	10/16/87
Bill Shields Warren Co. (5)	Flood Plain	Channel Change	Referred AG	10/20/87
City of What Cheer (6)	Wastewater	MIP	Referred AG	10/20/87
Giess Construction Co. Eagle Grove (2)	Solid Waste	Open Dumping	Referred AG	10/20/87
Kenneth Cooper Minbun (5)	Wastewater	Gas Spill	Referred AG	10/20/87
Country Corner Cafe Pacific Junction	Drinking Water	Penalty/Nitrate Monitoring	Referred AG	10/20/87
City of Sheldon (3)	Wastewater	Monitoring	Order/ Penalty	10/29/87
City of Liscomb (5)	Drinking Water	Monitoring - Bacteria	Order/ Penalty	10/29/87
City of Albion (5)	Wastewater	Monitoring	Order/ Penalty	10/29/87
City of Albion (5)	Wastewater	Certified Operator	Order/ Penalty	10/29/87
City of Albion (5)	Drinking Water	Certified Operator	Order/ Penalty	10/29/87
White Consolidated Industries Webster City (2)	Wastewater	Pretreatment	Order/ Penalty	10/29/87

MM:bag/CIMS06L02.03

DATE: November 2, 1987

TO: EPC

FROM: Mike Murphy

RE: Enforcement Report Update

The following new enforcement actions were taken last month:

Name, Location and Field Office Number	Program	Alleged Violation	Action	Date
City of Winfield (6)	Wastewater	Compliance Schedule	Order/ Penalty	10/29/87
Robert Moehle Sheffield (2)	Air Quality	Open Burning	Order/ Penalty	10/29/87
Hawkeye Tiling Jesup (1)	Air Quality	Open Burning	Order/ Penalty	10/29/87
Dalluge Turkey Grafton (2)	Solid Waste	Open Burning	Order/ Penalty	10/29/87
Kossuth Co. SLF (6)	Solid Waste	Daily Cover	Order/ Penalty	10/29/87

M E M O R A D U M

DATE: November 1, 1987
TO: Environmental Protection Commission
FROM: Mike Murphy
SUBJECT: Summary of Administrative Penalties

The following administrative penalties are due:

<u>NAME/LOCATION</u>	<u>AMOUNT</u>	<u>DUE DATE</u>
*Shelter Shield (Buffalo Center)	\$1,000	12-03-86
*Cedar Hills Apartments (Dubuque)	1,000	12-29-86
*City of Dysart	400	3-13-87
*Country Corner Cafe (Pacific Junction)	451	8-05-87
JTM Indust./MacDade/Leamer (Pleasant Valley)	1,000	8-12-87
**Ken Turner (Fort Madison)	150	9-15-87
Big Rock Tap	660	9-21-87
*Elings/Catron/Frey (Des Moines)	1,000	10-18-87
Twelve Mile House (Bernard)	339	10-28-87
**K & K Truckstop (Lenox)	62	11-01-87
*OK Lounge (Marion)	448	11-01-87
Timberline Assoc. Ltd (W. Burlington)	1,000	11-02-87
Ottumwa Industrial Airport	1,000	11-23-87
J.C. White Excavating (Des Moines)	1,000	11-29-87
City of Gravity	100	11-30-87
Pleasant Creek Estates (Shellsburg)	200	11-30-87
Keokuk Landfill, Inc.	600	11-30-87
Van Deist Supply Co. (Webster City)	1,000	12-01-87
Northwestern States Cement (Mason City)	1,000	12-01-87
City of Brighton	700	12-04-87
*Lawrence Payne (Ottumwa)	700	12-05-87
Skyline Inn (Dubuque)	290	12-06-87
AMPEL, Inc. (Des Moines)	600	12-07-87
Arlene's Cafe (Turin)	212	12-07-87
Follett's Tap (Camanche)	448	12-07-87
City of Lynnville	100	12-08-87
Cutty's of Okoboji (Spirit Lake)	212	12-12-87
John Hanson, Winnebago Industries	600	12-12-87
City of Montour	100	12-19-87
Kimballton Utilities	100	12-19-87
Shiloh (Kalona)	100	12-19-87
Cotter Elementary School (Columbus Junction)	100	12-19-87
City of Arcadia	200	12-19-87
City of Hornick	200	12-19-87
City of Earlville	100	12-20-87
City of Sheldahl	100	12-20-87
City of Ferguson	100	12-21-87

* Referred to the Attorney General
 ** On Payment Schedule

MPM:rag/I122N01.01

Administrative Penalties Due (Continued)

<u>NAME/LOCATION</u>	<u>AMOUNT</u>	<u>DUE DATE</u>
St. Cecelia-St. Joe School (Bode)	100	----
City of Sheldon	900	----
City of Liscomb	224	----
City of Albion	600	----
White Consolidated Industries (Webster City)	1,000	----
City of Winfield	500	----
Robert Moehle (Sheffield)	300	----
Hawkeye Tiling (Jesup)	1,000	----
Dalluge Turkey Farm (Grafton)	300	----
Kossuth County SLF	700	----
*Chico's Supper Club (Burr Oak)	954	6-10-88

The following administrative penalties have been appealed:

<u>NAME/LOCATION</u>	<u>AMOUNT</u>
Kula and Boge (Martelle)	\$1,000
Handi-Klasp, Inc. (Webster City)	1,000
Munn and Traum (Davenport)	100
Iowa City Regency MHP	1,000
Bianchi Meyrat Lagoon (Des Moines)	600
Thomas E. Lennon (Barnum)	700
Trausch Co., Inc. (Carroll)	1,000
Trausch Co., Inc. (Carroll)	1,000
City of Inwood	400
Clarion Farmer's Coop	750
Great Rivers Coop (Atavia)	1,000
Poweshiek Rural Water	500
Rich Metals (Davenport)	1,000
Village Oaks Homeowners Ass'n (Blue Grass)	424
City of Wapello	500
City of Newell	500
Gradert, Ernest and Kevin (Sibley)	500
Ottumwa-Wapello County SLF	1,000
Stanton Cooperative	1,000
Richard Harstack (Clarinda)	1,000
Mark Wallin (Essex)	1,000
City of University Park	500
City of Mt. Vernon	1,000
Accent Lawn and Leisure (Mt. Joy)	1,000
Wilton Steel Processing (Wilton)	1,000
City of Wilton	1,000
Spectra Health Care (Storm Lake)	580

* Referred to the Attorney General

** On Payment Schedule

The following administrative penalties were paid in October:

<u>NAME/LOCATION</u>	<u>AMOUNT</u>
**K & K Truckstop (Lenox)	\$ 25
*Giese Construction Co. (Eagle Grove)	1,000
City of Swan	400
Glen Mark Subdivision (Burlington)	436
City of Ireton	500
Bremer Utilities	50
City of Dixon	200
Linwood Mining (Davenport)	1,000
City of Elkhart	1,000
City of Vincent	100
Hartman's Riverside Camp (Harper's Ferry)	448
Viking Galley (Vinton)	50
Des Moines Asphalt	200
City of Fremont	50
Scotty's Auction Service	500
Everco Industries (Ottumwa)	1,000

* Referred to the Attorney General

** On Payment Schedule

DEPARTMENT OF NATURAL RESOURCES
 ENVIRONMENTAL PROTECTION COMMISSION
 ATTORNEY GENERAL REFERRALS
 NOVEMBER 1, 1987

Name, Location and Region Number	New or Updated	Program	Alleged Violation	DNR Action	Status	Date
Alder Corporation Council Bluffs (4)	Updated	Hazardous Waste	Release of Hazardous Substances	Referred to Attorney General	Referred	12/16/82
					EPA suit filed	2/26/87
Boyer Valley Company Denison (4)	Updated	Wastewater	Prohibited Discharge	Referred to Attorney General	State intervention	3/05/87
					Motion to dismiss agreed	9/21/87
Bozarth and Bell, Inc. Davenport (6)	Updated	Solid Waste	Open Dumping	Order	Referred	10/27/86
					Consent Decree	12/15/86
Bryant, Robert E. Cherokee (3)	Updated	Wastewater	Prohibited Discharge	Order	Referral	9/21/87
					Suit Filed	2/20/87
Cedar Hills Apts. Dubuque (1)	Updated	Water Supply	Monitoring; Operating without permit	Order/Penalty	Suit Filed	4/23/87
					Default Judgment \$7500	6/22/87
Chicago Northwestern RR	New	Air Quality	Open Burning	Referred to Attorney General	Motion to set aside overruled	10/30/87
					Referred	6/01/86
Chico's Supper Club Ft. Madison (6)	Updated	Water Supply	Monitoring; Operating without permit	Order/Penalty	Suit Filed	9/08/86
					Bankruptcy Proceedings	
Cooper, Kenneth Hinsburn (5)	New	Storage Tank	Spill Cleanup	Order	Referred	2/20/87
					Suit filed	4/27/87
Country Corner Cafe Pacific Junction (4)	New	Drinking Water	Monitoring; Penalty	Order/Penalty	Referred	10/20/87
					Referred	3/20/87
Dysart, City of (5)	Updated	Wastewater	Compliance Schedule	Order/Penalty	Consent Decree	10/27/87
					Referred	5/21/87
Eilers, Dwayne Hartico (1)	Updated	Flood Plain	Unauthorized Fill	Referred to Attorney General	Suit Filed	9/30/87
					Referred	6/19/84
					Suit Filed	11/01/85
					Default Judgment	1/12/87
					Bankruptcy	

DEPARTMENT OF NATURAL RESOURCES
 ENVIRONMENTAL PROTECTION COMMISSION
 ATTORNEY GENERAL REFERRALS
 NOVEMBER 1, 1987

Name, Location and Region Number	Rev or Updated	Program	Alleged Violation	DNR Action	Status	Date
Elings, Catron Des Moines (5)	New	Solid Waste	Open Dumping	Order/Penalty	Referred	10/20/87
Flynn, Robert Kaota (6)		Flood Plain	Channel Change	Order	Referred	5/21/87
Garner, City of (2)	New	Wastewater	Compliance Schedule	Order	Referred	9/21/87
Giess Construction Co. Eagle Grove (2)	New	Solid Waste	Open Dumping	Order/Penalty	Referred Penalty Paid	10/20/87 10/26/87
Richory Grove MRP Ames (5)	Updated	Drinking Water	Failure to Monitor	Order	Referred Consent Decree	5/21/87 10/26/87
Hill Top Feed Yards, Inc.; Western Cornbelt Credit Corp. Pottawattamie County (4)	Updated	Wastewater	Discharge	Order	Referred Suit Filed Hill Top Dismissed Hearing Set	9/16/85 1/23/86 11/ /87 11/02/87
Jungling Farms, Inc. Butler County (2)		Wastewater	Prohibited Discharge	Order	Referred Suit Filed	7/21/86 1/31/87
King, James & Julia		Flood Plain	Channel Change	Order	Referred	8/20/87
OK Lounge Marion (1)	Updated	Drinking Water	Failure to Monitor	Order	Referred Consent Decree	6/29/87 10/08/87
Parker, A.J. Disposal (4)		Solid Waste	Operation Violations at Permitted Site	Order	Referred Injunction Issued Compliance Date	3/21/79 2/28/80 5/21/81
Payne, Lawrence Ottawa (6)		Solid Waste	Open Dumping	Order/Penalty	Referred Suit Filed Consent Decree	2/20/87 4/23/87 11/ /87

DEPARTMENT OF NATURAL RESOURCES
 ENVIRONMENTAL PROTECTION COMMISSION
 ATTORNEY GENERAL REVERENDS
 NOVEMBER 1, 1987

Name, Location and Region Number	New or Updated	Program	Alleged Violation	DMR Action	Status	Date
Ponter Derby Oil Company Deversport (6)		Nastomster	Prohibited Discharge	Referred to Attorney General	Petition Filed	3/ /83
					Judgment	10/12/84
					Appealed Cleanup Plan Approved	10/25/84 1/27/86
Poggenhiller, William et.al. Washington County (6)		Flood Plain	Channel Change	Referred to Attorney General	Referred	3/20/87
					Suit Filed	6/25/87
Kinshart Construction Co. Dallas County (5)	Updated	Solid Waste	Penalty Nonpayment	Order	Referred	8/20/87
					Penalty Paid	8/25/87
Salisbury, Ronald, Presto-X Des Moines (5)		Hazardous Waste	Treatment and Storage Violations	Referred to Attorney General	Referred	9/18/84
					Judgment	5/86
					Appealed to Sup. Court Briefs Filed	7/86 10/86
Shelbar Shield Buffalo Center (6)		Air Quality	Excess Emissions: Construction w/o permit Order/Penalty	Referred	Referred	2/20/87
					Suit Filed	6/30/87
Shields, Hill	New	Flood Plain	Channel Change	Order	Referred	10/20/87
Wisconsin Barge Service Clinton (6)		Nastomster	Prohibited Discharge	Referred to Attorney General	Referred	11/20/85
					Suit Filed	7/86
Warner Feedlot (6)	New	Nastomster	Prohibited Discharge	Order	Referred	9/21/87
West Chester, City of (6)	New	Nastomster	Compliance Schedule	Order	Referred	10/20/87
					Referred	11/27/84
					Hearing	4/22/85
					Consent Decree	4/25/85
					Contempt Finding	7/02/85
Wolleson, Robert C. Duena Vista and Cherokee Counties (3)	Updated	Nastomster	Prohibited Discharge	Order	Contempt Finding	9/25/86
					Contempt Finding	8/24/87
					Referred	7/31/86
Woodland Fork Jones County (1)		Nastomster	Prohibited Discharge	Order	Suit Filed	11/19/86
					Temporary Injunction	2/13/87

DEPARTMENT OF NATURAL RESOURCES
 ENVIRONMENTAL PROTECTION COMMISSION
 ATTORNEY GENERAL MEMORANDUM
 NOVEMBER 1, 1987

Name, Location and Region Number	New or Updated	Program	Alleged Violation	DNR Action	Status	Date
Woodside Mobile Home Estates Mount Pleasant (6)		Drinking water	Failure to Monitor	Order	Referred - Suit Filed	5/31/85 1/24/86
					Suit Filed	12/18/84
Yocum, Max Johnson (6)			Prohibited	Defending	Motion to Dismiss	3/06/85
			Construction	Referred to Attorney General	Denied	8/07/85
	Updated	Flood Plain			Referred	7/12/85
					Counter Claim Filed	10/85
					Trial Held	6/16/87
					Judgment for Department	8/18/87
					Appealed to Supreme Court	9/01/87

DEPARTMENT OF NATURAL RESOURCES
 ENVIRONMENTAL PROTECTION COMMISSION
 CONTESTED CASES
 NOVEMBER, 1987

DATE RECEIVED	NAME OF CASE	ACTION APPEALED	PROGRAM	ASSIGNED TO	STATUS
10-17-85	City of Bevington	Administrative Order	WM	Hansen	Hearing continued.
1-23-86	Delwein Soil Service	Administrative Order	WM	Landa	Hearing continued; cleanup study progressing.
6-12-86	ADM - Clinton	Administrative Order	Air	Landa	Hearing continued.
9-10-86	Kula and Boye	Administrative Order	SM	Landa	Negotiating before filing. Removal completed.
10-29-86	Handi-Klasp Company, Inc.	Administrative Order	AQ/WM/SM	Landa	Hearing set for 11-03-87
12-03-86	City of Menkee	Administrative Order	MS	Hansen	Hearing continued.
12-11-86	Eloise Reese	Permit Condition	FP	Clark	Hearing set for 11-17-87.
12-24-86	Francis Memberlin	Administrative Order	FP	Clark	Hearing set for 12-06-87.
3-18-87	Greiner	Administrative Order	FP	Clark	Proposed Decision 10-19-87.
3-25-87	City of Long Grove	Design Denial	WM	Hansen	Proposed decision 9-10-87; affirmed 10-20-87.
3-25-87	Traum and Mann	Administrative Order	SM	Kennedy	Negotiating before filing.
4-06-87 7-16-87	Scotty's Auction Service	Administrative Order	SM AQ	Kennedy	Settled.
5-05-87	Des Moines Metro SLF	Administrative Order	SM	Kennedy	Proposed decision 8-8-87; EPC reversed 10-20-87.
5-12-87	Iowa City Regency MUP	Administrative Order	WM	Hansen	Hearing set for 11-03-87.
5-28-87	Bianchi-Meyrat Lagoon (Bank Smith)	Administrative Order	WM	Kennedy	Hearing continued.
6-08-87	Willow Creek Dam/Zarbale et.al	Permit Issuance	FP	Clark	Negotiating before filing.
7-30-87	Treusch Company, Inc.	Administrative Order	WM/RC	Landa	Hearing set for 11-23-87
6-11-87	Thomas Lannon	Administrative Order	FP	Clark	Hearing set for 01-12-88.
8-10-87	Great Rivers Co-op	Administrative Order	RC	Landa	Hearing continued; study proceeding.
8-17-87	City of Mapello	Administrative Order	WM	Hansen	Hearing held for 10/27/87.
8-17-87	City of Donnellson	Administrative Order	WM	Hansen	Hearing continued.

DEPARTMENT OF NATURAL RESOURCES
 ENVIRONMENTAL PROTECTION COMMISSION
 CONTESTED CASES
 NOVEMBER, 1987

DATE RECEIVED	NAME OF CASE	ACTION APPEALED	PROGRAM	ASSIGNED TO	STATUS
8-24-87	Rich Metals Co.	Administrative Order	AQ	Landa	Settled.
8-27-87	Village Oaks Homeowners Assn.	Administrative Order	NS	Murphy	Hearing continued.
9-01-87	City of Newell	Administrative Order	NH	Hansen	Hearing set for 11-18-87.
9-02-87	City of Mt. Vernon	Administrative Order	MI	Hansen	Hearing set for 11-17-87.
9-17-87	Gradert, Kevin and Ernest	Administrative Order	AQ	Landa	Hearing Set for 12-11-87.
9-23-87	Ottawa-Repello County SJF	Administrative Order	SN	Kennedy	New Case.
10-05-87	Bremer County	Permit Denial	SM/AQ	Landa	Motion to EPC 11-16-87.
10-09-87	City of Milton	Administrative Order	NH	Landa	Hearing Set for 12-15-87.
10-09-87	Everco Industries, Inc.	SMA Denial	SN	Landa	New Case.
10-15-87	Accent Lawn & Leisure	Administrative Order	AQ	Landa	Hearing Set for 12-16-87.
10-16-87	Stanton Cooperative	Administrative Order	NC	Landa	Hearing Set for 12-18-87.
10-16-87	Milton Steel Processing, Inc.	Administrative Order	NH	Landa	New Case.
10-22-87	University Park	Administrative Order	NH	Hansen	New Case.
10-23-87	Martstach, Mallin	Administrative Order	NC	Landa	New Case.

ENVIRONMENTAL PROTECTION COMMISSION

ITEM

8

INFORMATION

METRO EAST SANITARY LANDFILL REPORT

At the direction of the Environmental Protection Commission, DNR staff conducted a three month study (May - July 1987) to identify the quality of the surface water and groundwater in proximity to the Des Moines Metro Landfill. Groundwater sampling was conducted at 24 private wells located at 16 residences in the vicinity of Des Moines Metro Landfill. Nine surface water sampling locations on Camp Creek and its tributaries were sampled. Forty-one (41) chemical tests were done on each groundwater sample and sixteen (16) tests were done on each surface water sample. A report on the results of this study will be presented to the Commission.

Jim Stricker
October 29, 1987

Surface and Groundwater Study
of the
Metro East Sanitary Landfill and Vicinity
Polk County, Iowa

Field Office #5, Des Moines
Field Evaluation and Emergency Response Bureau
Environmental Protection Division
Department of Natural Resources
May - July, 1987

This document was prepared by the Iowa Department of Natural Resources with analytical assistance from the University Hygienic Lab and through a grant from the U.S. EPA.

TABLE OF CONTENTS

	<u>Page No.</u>
Abstract	1
Introduction	2
Scope	2
Results	2-5
Findings	5-6
Study Costs	6

APPENDICES

Draft Work Plan	Appendix A
Surface Sampling Points Map	Appendix B
Groundwater Monitoring Location Map	Appendix C
Private Well Location Map	Appendix D
Groundwater Lab Data Sheets	Appendix E
Surface Water Lab Data Sheets	Appendix F
Private Well Characterization	Appendix G
Summary Table of Well Characteristics	Appendix H
Iowa Class B Water Quality Standards	Appendix I
Summary Table of Surface Water Data	Appendix J
IDNR Safe Drinking Water Standards	Appendix K
Secondary Drinking Water Guidelines	Appendix L
Well Results for Chemical Oxygen Demand	Appendix M
Summary Table of Selected Well Data	Appendix N

ABSTRACT

At the direction of the Environmental Protection Commission, DNR staff conducted a three month study (May - July 1987) to identify the quality of the surface water and groundwater in proximity to the Des Moines Metro Landfill. Groundwater sampling was conducted at 24 private wells located at 16 residences in the vicinity of Des Moines Metro Landfill. In addition, nine surface water sampling locations on Camp Creek and its tributaries both upstream and downstream from the landfill were sampled. Forty-one (41) chemical tests were done on each groundwater sample and sixteen (16) tests were done on each surface water sample.

Groundwater results were compared to EPA drinking water standards and results from other well sampling studies conducted throughout Iowa. Surface water results were compared to Iowa water quality standards established for the protection of aquatic life (Class B warm water standards).

The only results exceeding EPA primary drinking water standards were results for nitrate for two of the 24 wells and a single result for lead, later associated with lead solder inside one of the residences sampled. The high nitrate wells were located north of the landfill, upstream of the normally accepted groundwater flow, suggesting other sources, such as agricultural practices may be influencing these results. In fact, one of the two wells having high nitrate concentrations was selected only as a background well to show groundwater quality away from the landfill. This well is located one mile north of the landfill. The results of all samples show that 99.6% of all sample results did not exceed EPA primary drinking water standards.

Those tests run on groundwater samples for which no EPA standards exist were also reviewed to determine possible patterns of contamination. None of the groundwater sample results showed any definable pattern.

Surface water sample results were compared to Iowa water quality standards for aquatic life protection. Although Camp Creek is not designated for this classification it was selected for comparison purposes as being most representative for the uses observed. No violations of water quality standards were found. Water quality in Camp Creek was as good or better than the quality required for aquatic life protection.

This sampling of 24 private wells had better quality water, as measured against Federal standards, and based on the tests done, than a random sample of private or public wells might be expected to have elsewhere in Iowa. No serious water quality problems were found as a result of this study. No readily apparent impact either to surface or groundwater quality attributable to the landfill was found.

SURFACE AND GROUNDWATER STUDY

Metro East Sanitary Landfill and Vicinity
Polk County, Iowa

Introduction

On April 21, 1987 the Environmental Protection Commission directed the staff of the Environmental Protection Division of the Department of Natural Resources to develop a work plan and conduct surface and groundwater sampling to identify the quality of the surface water and groundwater in proximity to the Metro East Sanitary Landfill. The work plan (attached as Appendix A) was completed on May 1, 1987 and presented to and approved by the Environmental Protection Commission at their May meeting. Sampling and analyses were conducted in May, June and July 1987. This report summarizes pertinent data from that sampling to provide a picture of surface and groundwater quality in the vicinity of the Metro East Sanitary Landfill. Specific information on the monitoring locations, tests run on the water samples, sampling frequency and sampling and inspection procedures are contained in the work plan (Appendix A).

Scope

A map of surface sampling locations is included as Appendix B. A map of the properties with private wells which were sampled is included as Appendix C. Appendix D shows the approximate location of each of the well sampling points with location numbers used to identify sample results.

Groundwater samples from 24 wells at 16 private residences near the Metro East Sanitary Landfill were collected in May, June and July (data contained in Appendix E). Surface water samples from nine stream locations on Camp Creek and tributaries near the landfill were also collected in May, June and July. (data contained in Appendix F).

Results

Because well construction and depth frequently impact the quality of the well water (groundwater), each private well sampled was carefully inventoried. Description of the wells is included as a part of the report (Appendix G) and a summary of well characteristics is also included (Appendix H). All data that could not be visually confirmed was obtained from the individual property owners. Such information as well depth and age of well is based on verbal communication by the property owner and was not independently confirmed.

Well sampling was conducted on May 20-21, June 16-17, and July 14-15, 1987. Camp Creek sampling was conducted on May 29, June

24 and July 17, 1987. All sampling and analyses were conducted in accordance with the work plan.

Surface water sampling locations are described in the work plan (Appendix A). All surface water sample data were reviewed against Iowa water quality standards for Class "B" streams for comparison purposes. While Camp Creek has not been classified as a Class "B" waterway, Class "B" standards are designed for aquatic life protection and livestock watering. These uses appear consistent with those for Camp Creek observed as a part of this study. Class "B" standards are contained in the Iowa Administrative Code and are included as a part of this report (Appendix I). Results obtained in the sampling and testing were as good as and, in most cases, better than Class "B" standards. A summary of the surface water sampling data is contained in this report (Appendix J).

Nitrate is one of the dissolved chemicals found in groundwater and measured as a part of this study. Nitrate, at high concentrations can result in oxygen deficiency problems in infants. For this reason, the Environmental Protection Agency (EPA) has set a maximum safe level for nitrate of 45 mg/l. Nitrate is a naturally occurring chemical in groundwater in low concentrations. A number of human activities have resulted in elevated levels of nitrate in the groundwater in many locations. Activities such as fertilizer application, feedlot runoff, landfill operation, improper abandonment of old wells, all contribute to increasing the nitrate concentration in the groundwater.

Groundwater data from the 24 wells were compared to the Environmental Protection Agency (EPA) primary safe drinking water standards (Appendix K). Two wells (DeGroot well #1 and Burdock well #3A) contained nitrates which exceeded the maximum contaminant level (MCL). Samples from these two wells, exceeded the nitrate MCL each of the three months sampling was conducted. These two wells represent only 8% of the wells sampled for nitrate.

For comparison purposes, a study by Gopal and Talcott entitled "Patterns in Groundwater Quality, Selected Observations in Iowa", reported on 44,000 private well samples collected throughout the State between 1978 and 1981. Their study found that 20% of all of these private well samples exceeded the nitrate MCL. In addition, a study entitled "Nitrates in Iowa's Groundwater" by the Department of Natural Resources reported that between 21% and 40% of private wells in Polk and Jasper counties exceeded the nitrate MCL.

Heavy metals results from the private wells were also compared to primary safe drinking water standards. One sample collected in May 1987 (Sampson well #12) exceeded the MCL for lead. Mr. Sampson reported that lead solder had been used in the piping within the residence following a review of the May results. Subsequent samples at the Sampson well were collected prior to soldered pipes in the house. No lead was detected in the June or

July sampling. No other heavy metal samples exceeded primary safe drinking water MCL's.

Twelve synthetic organic compounds (SOC's) were analyzed from each of the 24 private wells for each of the three months. These 12 synthetic compounds (see Appendix A for list) were selected because they have all been identified by EPA as possible carcinogens, have had drinking water standards established for them and have been proposed by the Department of Natural Resources for expanded landfill groundwater monitoring requirements in proposed rules. Trihalomethanes are four SOC's which have been grouped together by the EPA and given a maximum contaminant level for the entire group rather than individually. The four chemicals which form the trihalomethane group are bromodichloromethane, dibromochloromethane, chloroform and bromoform. These four, commonly grouped under the heading of trihalomethanes, are among the twelve SOC's tested.

SOC's were detected in 4 of the 24 wells (Sloan well #8 only in July, Lyle Gulling well #7 only in June, Burdock well #3B in May and July only, and Gaas well #11B in all three months). Trihalomethanes were the type of organics found in the Gulling, Burdock and Gaas wells. Trichloroethane was found in the Sloan well in July at a level of 1 part per billion (ppb). Levels of trichloroethane below 1 ppb are below the limit of detection of the University Hygienic Lab (UHL) and are listed as undetectable. Therefore the trichloroethane value for the Sloan well is at the limit of detectability used by UHL for these analyses.

Trihalomethanes, have been found in 335 of 560 public water supplies which have reported results to the Department of Natural Resources this past year. The MCL (Appendix K) for trichloroethane established by EPA is 200 parts per billion (ppb). The MCL for the trihalomethane group of SOC's is 100 parts per billion. None of the test results from the 24 wells exceeded the MCL standards established by EPA for drinking water.

While no recommended standards (Appendix L) or maximum contaminant levels (MCL's) (Appendix K) have been established for chemical oxygen demand (COD), this test is frequently used as a measure of organic material in water and is routinely monitored at landfills statewide. For these reasons COD testing was also conducted on the private wells sampled. Because no standards are established for this test and because no other data were available from other sources for comparison purposes, test results are presented on two location maps of the landfill area. The first map (Appendix M) shows COD results for shallow wells (less than 60 feet deep). The second map (Appendix M) shows COD results for wells deeper than 60 feet. As can be seen from reviewing the maps, no pattern is apparent.

Other chemical and mineral data were reviewed and compared to EPA secondary drinking water standards (Appendix L) where applicable. Tests for minerals such as iron, sulfate, total dissolved solids,

and chlorides are of concern to water users because they effect the aesthetic quality of the water. That is, the above minerals may make the water undesirable for particular uses but would not effect its safety for drinking. For example, high levels of iron, dissolved solids or sulfates could result in a heavy mineral taste to the water that some users might find objectionable but would not make it unsafe to drink. These chemicals and minerals commonly occur in groundwater. They frequently occur as a result of minerals being dissolved into the groundwater as a result of the type of soil and rock materials with which the groundwater comes into contact. As with nitrates, a variety of human activities also may influence the concentration of these contaminants, including landfill operation, application or storage of chemicals on the land and irrigation.

Of the 24 wells tested, 17 of 24 (71%) exceeded the recommended aesthetic standard for total dissolved solids of 500 mg/l. Testing of 215 municipal water supplies statewide in 1985 and reported in "Water Resources Data, Iowa, Water Year 1985" published by the U.S. Geological Survey, found 37% of the municipal supplies tested also exceeding the recommended standard for total dissolved solids.

Ten (42%) of the private wells sampled as a part of this study contained sulfate concentrations exceeding the recommended aesthetic standard. For comparison purposes, the above referenced USGS study found 12% of the municipal water supplies tested also exceeding the recommended standard.

Test results from the 24 private wells sampled in this study showed no samples containing chlorides exceeding EPA recommended standards. Thirteen (54%) of the wells contained iron concentrations exceeding recommended standards. The USGS study found 54% of the municipal wells sampled exceeded the recommended iron standard.

The above data were examined to determine any visible directional pattern regarding high contaminant levels, particularly as they might be associated with leachate from the sanitary landfill. High values for the sulfates, total dissolved solids and iron are widely dispersed geographically. Low values (those below EPA recommended standards, Appendix L) for the above minerals were found predominantly in wells along Camp Creek downstream from the landfill.

Findings

Only two wells were found to exceed any Safe Drinking Water primary maximum contaminant levels (MCL's). The high levels were for nitrate which is a problem in many wells both public and private throughout Iowa. Given the location of the wells with high nitrates (upstream from the landfill) and the numerous other ways that nitrate concentrations are affected in the groundwater, there is no indication that these high nitrate levels are the result of landfill operations. The percentage of wells exceeding

the MCL for nitrate from the group studied was lower (8%) than that for all wells in Polk and Jasper counties (20-40%) or throughout Iowa (20%).

Low levels of contamination by synthetic organic compounds (SOC's) were found in 4 of the 26 wells. Here too, the percentage of wells for which SOC's were detected (16%) is lower than that for all public water supplies in Iowa (60%). Again there is no indication that landfill activities have influenced groundwater quality for the SOC's.

Other chemical and mineral tests were run to determine well water quality and potential for landfill leachate contamination including total dissolved solids, sulfate, chloride and chemical oxygen demand (COD). While results varied from well to well, average values were at levels exceeded by at least 10% of Iowa's public water supplies. The best water quality, as measured by these tests, was located along Camp Creek, downstream from the landfill.

Surface water samples showed water quality in Camp Creek meeting standards set by the State for aquatic life protection and livestock watering.

Based on the sampling and testing done as a part of this study, there is no readily apparent impact on neighboring private wells attributable to the landfill. This sampling of 24 private wells had, in fact, better quality water, as measured against Federal standards, and based on the tests done, than any random sample of private or public wells might be expected to have elsewhere in Iowa.

STUDY COSTS

A breakdown of the costs for this study are provided below:

Analytical Costs		
DNR	\$5,000	
UHL	16,000	
Salaries	9,450	(0.27 FTE)
Equipment & Expense Costs	115	
TOTAL COST	\$30,565	

APPENDIX A

DRAFT WORK PLAN

Water Quality Monitoring Program

D.M. METRO LANDFILL

5/1/87

I. Objectives

In response to the directive from the Environmental Protection Commission, the following work plan is proposed to identify the quality of the surface water and groundwater in proximity to the D.M. Metro Landfill.

II. Background

On February 23, 1987 the Department of Natural Resources received complaints regarding land application of sludge and proper landfill operation at the Metro East landfill. Samples of Camp Creek sediment and water were collected on March 24, 1987. Additional stream sampling of Camp Creek was done on April 6, 1987. Sampling of groundwater monitoring wells for Metro Landfill were collected on April 20, 1987.

III. Scope

Sampling will be conducted on selected existing private wells and Camp Creek. Ten or twelve wells at existing homes and farmsteads nearest the landfill site will be selected. Three or four wells at least 0.5 miles south of the landfill will be sampled if any can be found that are within 0.25 miles of Camp Creek. Two wells will be selected that are at least one mile from the site in a generally northerly, upgradient direction to serve as "controls". Surface water sampling will also be conducted in Camp Creek between Metro East landfill and Red Rock Reservoir. Specific sampling locations are attached to and made a part of this workplan, as Appendix I.

IV. Monitoring Network

A. Design and Rationale

The monitoring network is based on information on the existence and availability of wells. Surface water sampling locations will be the same as previous surface water sampling locations. In addition we will sample Camp Creek near its confluence with the Des Moines River/Red Rock Reservoir, in order to assess any possible environmental impact of pollution at that location. A list of wells and their specific locations is attached to and made a part of this workplan. A map of the proposed sampling locations is attached.

B. Parameters Monitored

The parameters that will be monitored for in the wells are shown in Section VII A. They include the first two groups of parameters listed in the proposed rules for "Hydrologic Monitoring System For Solid Waste Disposal Facilities" and inorganic parameters identified for monitoring by public drinking water supplies.

A separate list of parameters, chosen to show possible pollution in Camp Creek, is also shown in VII A.

C. Collection Frequency

Surface water samples will be collected once per month for three consecutive months (May, June and July 1987).

Each well selected will be sampled once per month for three consecutive months (May, June and July, 1987). This schedule may be amended or extended if information comes to the attention of the department which indicates that an expanded sampling program is necessary.

V. Project Organization & Responsibility

The following is a list of key project personnel and their corresponding responsibilities:

Division Administrator:

Allan Stokes
Environmental Protection Division
Department of Natural Resources
H.A. Wallace Building
Des Moines, Iowa 50319
(515) 281- 6284

Quality Assurance Officer:

Darrell McAllister, EPD
Department of Natural Resources
H.A. Wallace Building
Des Moines, Iowa 50319
(515) 281- 8869

Project Officer:

Jack Clemens, EPD
Department of Natural Resources
H.A. Wallace Building
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(515) 281- 8693

Field Sampling:

Steve Grgurich, EPD
Department of Natural Resources
H.A. Wallace Building
Des Moines, Iowa 50319
(515) 281- 8940

Laboratory Analysis:

Lee Friell
University Hygienic Laboratory
H.A. Wallace Building
Des Moines, Iowa 50319

(515) 281- 5371

Laboratory QC:

Gene Ronald
University Hygienic Laboratory
H.A. Wallace Building
Des Moines, Iowa 50319
(515) 281- 5371

VI. Schedule of Tasks

Sampling of Monitoring Wells and Camp Creek	May - July 1987
Receipt of Final Data from Laboratory	30 days after last sampling
Completion of Report	10 days after receipt of data

VII. Data Quality

A. Objectives

The data quality objectives for this task have been set at the laboratory's normal quantitation limits. Quantitation limits are the lowest concentration for which UHL will assign a numerical value. This allows the evaluation of the samples at concentrations below the Maximum Contaminant Limits (MCL) for drinking water as defined in IAC Chapter 41. Also, for some parameters there is no MCL.

The objectives are included here for informational purposes.

1. Wells

Parameter	Data Quality Objective
Arsenic, Total	0.01 mg/l
Barium, Total	0.05 mg/l
Cadmium, Total	0.001 mg/l
Chromium, Total	0.02 mg/l
Fluoride, Total	0.2 mg/l
Lead, Total	0.01 mg/l
Mercury, Total	2.0 mg/l
Magnesium, Total	1 mg/l
Selenium, Total	0.01 mg/l
Silver, Total	0.05 mg/l
Zinc, Total	0.02 mg/l
Copper, Total	0.02 mg/l
Suspended Solids, Total	variable **
Dissolved Solids, Total	variable
Sodium, Total	1 mg/l
Alkalinity	1 mg/l
Calcium, Total	1 mg/l
Manganese, Total	0.02 mg/l

<u>Parameter</u>	<u>Data Quality Objective</u>
Hardness	1 mg/l
Potassium, Dissolved	0.1 mg/l
Nitrate and Nitrite (as N)	0.2 mg/l
Benzene	5 ug/l
Carbon Tetrachloride	5 ug/l
1,2-Dichloroethane	5 ug/l
Trichloroethylene	5 ug/l
1,1,1-Trichloroethane	5 ug/l
1,1-Dichloroethylene	5 ug/l
Paradichlorobenzene	5 ug/l
Vinyl chloride	10 ug/l
Chloride	0.5 mg/l
Specific Conductance	1 micromho
pH	1 to 14 pH Units
Ammonia Nitrogen	0.1 mg/l
Iron, Dissolved	0.02 mg/l
Chemical Oxygen Demand	4 mg/l
Temperature	0-30 C
Sulfate	1 mg/l
Bromodichloromethane	5 ug/l
Dibromochloromethane	5 ug/l
Tribromomethane	5 ug/l
Trichloromethane	5 ug/l

** variable - The quantitation limit is variable for this item.

2. Surface Water

<u>Parameters</u>	<u>Objective</u>
Dissolved Solids	5 mg/l
Chemical Oxygen Demand	4 mg/l
Total Organic Carbon	1 mg/l
Total Cyanide	0.01 mg/l
Phenol	2 ug/l
Total Arsenic	0.01 mg/l
Total Barium	0.05 mg/l
Total Cadmium	0.001 mg/l
Total Chromium	0.02 mg/l
Total Copper	0.02 mg/l
Total Lead	0.01 mg/l
Total Mercury	2.0 mg/l
Total Nickel	0.05 mg/l
Total Selenium	0.01 mg/l
Total Silver	0.05 mg/l
Total Zinc	0.02 mg/l

B. Representativeness

This network has been designed to provide information on the ground water quality in the close vicinity of the landfill. It will provide representative information on the quality of the water during the spring of the year. It may not represent the quality of the water during the entire year. A similar study during any later year should show similar water quality.

VIII. Field Procedures

A. Inspection Procedures

During the initial sampling visit to each well the sampler(s) shall write down observations that will enable them to prepare a written summary of the well and site characteristics. Said summary shall include a description of the immediate area of the well and surrounding land uses. Visual observations of the well itself regarding type of construction, casing material, pump type, drainage, and any other pertinent information shall be noted. Other information may be obtained by questioning the owner regarding age, size, depth, history, etc.

During subsequent visits the sampler(s) shall refer to the original summary and note any changes that may have occurred.

Likewise, the sampler(s) shall write down observations of the surface water at the stream sampling locations. This summary shall include any odors noted, the appearance of the stream bottom, relative flow in the stream (high, low, intermediate), appearance of the water (clear, turbid, etc.), and any other pertinent observations that may assist in the analysis of the quality of the stream when compared to the Iowa Administrative Code General Water Quality Standards.

B. Sampling Procedures

Wells will be purged by pumping for at least three minutes prior to the sample being taken. All well samples shall be taken immediately after the well pump, if possible, or from the first accessible sampling point. No sample will be taken after a treatment device.

Camp Creek samples shall be taken directly from the stream and in such a way as to avoid contamination by sediment.

Duplicate samples will be taken for the organic compounds at all sampling sites. Duplicate samples will be collected at one sampling location during each of the three monthly samplings.

Samples will be coded to WQ-FS and sent to the University Hygienic Laboratory for analysis, in accordance with EPA approved methods.

The following preservation methods will be followed during sample collection and transportation and prior to analysis.

Parameters	Container	Preservation	Holding Time
Metals & Hardness	16 oz. plastic	HNO3 to pH<2	6 months*
F, Cl, Solids, S04, Alkalinity	1 qt. plastic	Cool to 4 C	28 days
NO3 & NO2, COD, NH3, TOC	8 oz. plastic	Cool to 4 C & H2S04 to pH<2	28 days
THM's & VOC's Paradichlorobenzene	3 - 40 ml vials	Cool to 4 C	14 days
Cyanide	1 qt. glass	Cool to 4 C NaOH to pH>12	14 days
Phenol	1 qt. glass	Cool to 4 C H2SO4 to pH<2	28 days

* 28 days for Mercury

C. Chain of Custody

The Division's sample custody procedure is in Appendix 1.

D. Field Equipment, Calibration and Preventative Maintenance

The pH meter will be calibrated according to the manufacturer's standards.

IX. Reporting

A summary report will be prepared by Field Office staff at the end of the sampling program evaluating the analytical data and visual observations and including any appropriate conclusions and recommendations. A copy of all analytical data will be attached to and be a part of the report.

X. Projected Cost of Effort

	Sampling Prior to 5/1/87	Proposed Sampling
Salaries		
Sample Collection	\$672	\$1,568
Report Preparation	696	672
UHL Analytical Costs	2,865	26,820
Total Sampling Cost	4,233	29,060

APPENDIX I

Private Well Monitoring Locations

Sample Number

- 1 Fred DeGroot - NE 23rd Ave. east of NE 120th St., 1 mi. North of landfill. - 20 ft. deep well.
- 2 Ernest Vogelaar - Highway 163 immediately North of the landfill - 148 ft. deep well.
- 3A Richard Burdock - Highway 163 NW of the landfill - 30 ft. deep well.
- 3B Richard Burdock - Highway 163 NW of the landfill - 365 ft. deep well.
- 4 Mrs. Benjamin Hibbs - South side of Highway 163, W of the landfill, east side of Camp Creek - shallow well.
- 5A Ms. Evelyn Danks - Highway 316, west of the landfill, west side of Camp Creek - 320 ft deep brick well.
- 5B Ms. Evelyn Danks - Highway 316, west of the landfill, west side of Camp Creek - 20 ft. deep well.
- 5C Ms. Evelyn Danks - Highway 316, west of the landfill, west side of Camp Creek - 30 ft. deep well.
- 6 Jerry Kane well (house owned by Mr. & Mrs. Carl Brown) Highway 316, southwest of the landfill, west side of Camp Creek - 35 ft. deep well.
- 7 Lyle Gulling - 11496 SE 6th Ave., southwest of the landfill, west side of Camp Creek - 30 ft. deep well.
- 8 Frank Sloan - 11825 SE 6th Ave., 0.5 miles south of the landfill, adjacent to Camp Creek on east side - 18 ft. deep well.
- 9A Blanche Gulling - 1125 SE 6th Ave, immediately south of the Sloan property, adjacent to Camp Creek on east side 30 ft. deep well.
- 9B Blanch Gulling - 1123 SE 6th Ave, immediately south of the Sloan property, adjacent to Camp Creek on east side 30 ft. deep well.
- 10 James Adkins - 11970 SE 6th Ave., 0.5 miles SSE of the landfill - 33 ft. deep well.
- 11A Harry Gaas - 127 1/2 SE 5th St. Place, 0.5 miles SE of the landfill - 325 ft. deep well.

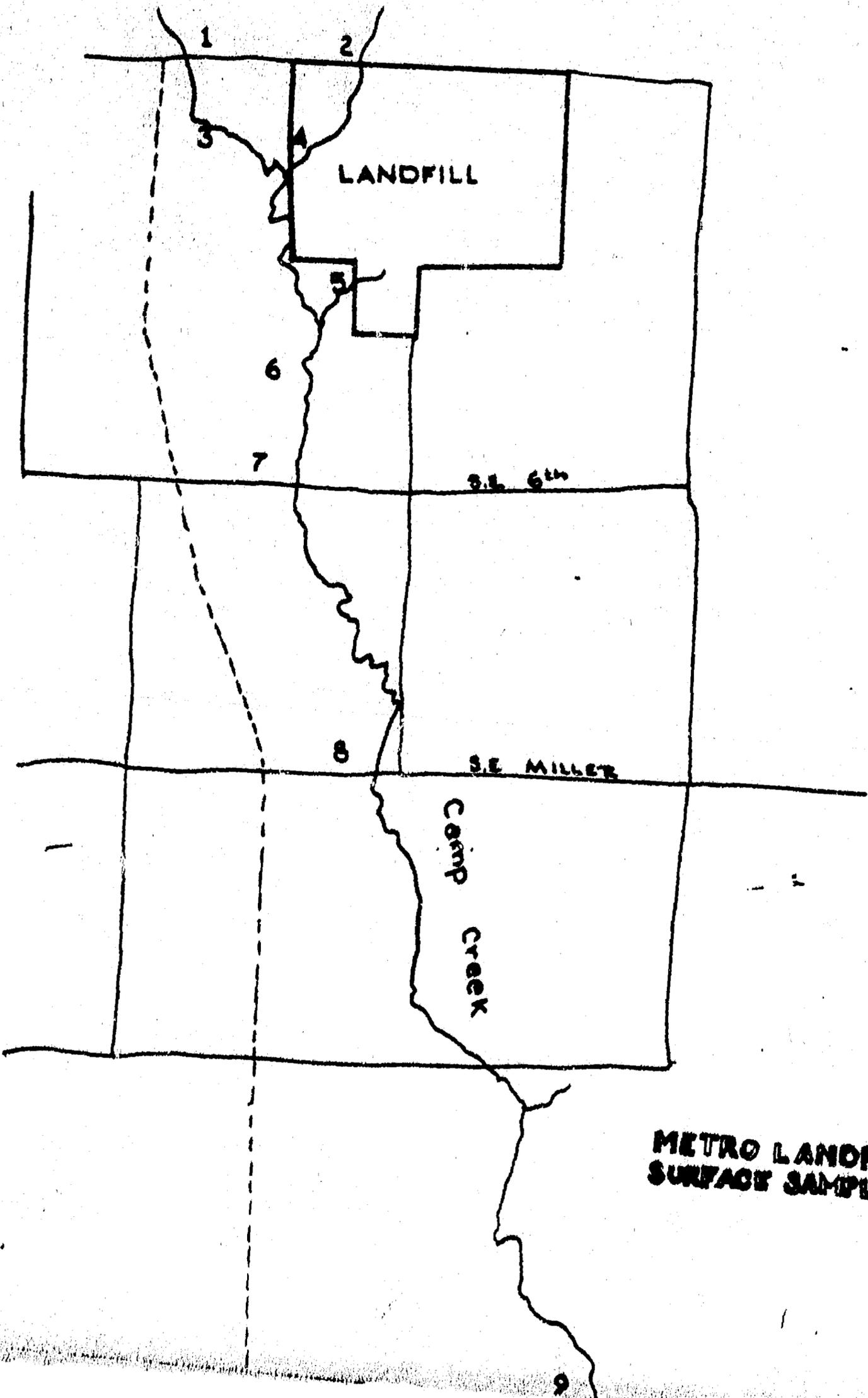
- 11B Harry Gaas - 127 1/2 SE 5th St. Place, 0.5 miles SE of the landfill - 60 ft. deep well.
- 12 Mark Sampson - Highway 163, 1256 SE University, immediately east of the landfill - 280 ft. deep well.
- 13A Wayne Miller - 1087 SE Camp Drive, 1 - 1.5 miles south of the landfill along Camp Creek - 15 ft. deep well.
- 13B Wayne Miller - 1087 SE Camp Drive, 1 - 1.5 miles south of the landfill along Camp Creek - 399 ft. deep well.
- 14 Don Miller - SE Miller Drive, 1.0 - 1.5 miles south of the landfill along Camp Creek - 40 ft. well.
- 15A Mike Johnston - RR, Mitchellville, northeast of landfill - 30 ft. deep well.
- 15B Mike Johnston - RR, Mitchellville, northeast of landfill - 300 ft. deep well.
- 15C Mike Johnston - RR, Mitchellville, northeast of landfill - 50 ft. deep well.
- 16 C.W. Soutter - RR, Mitchellville, 1 mile north of landfill - 239 ft. deep well.

Surface Water Monitoring Locations

Camp Creek

1. Camp Creek, Upstream of the Metro landfill, north of Highway 163 at the County Road Bridge.
2. North Drainage Ditch tributary to Camp Creek at Highway 163.
3. Near the mouth of the North Drainage Ditch tributary to Camp Creek.
4. Camp Creek immediately west of the landfill, approximately 0.25 miles south of Highway 163, above confluence with North Drainage Ditch.
5. Camp Creek southwest of the landfill below the confluence with the South Drainage Ditch, approximately 100 yards.
6. South Drainage Ditch tributary to Camp Creek, approximately 100 feet above the mouth.
7. Camp Creek southwest of the landfill at the SE 6th Avenue Bridge.
8. Camp Creek at County Road Bridge 1 mile south of sample location #7.
9. Camp Creek at SE Vandalia Rd. Bridge, SE of Runnells near confluence with Red Rock Reservoir.

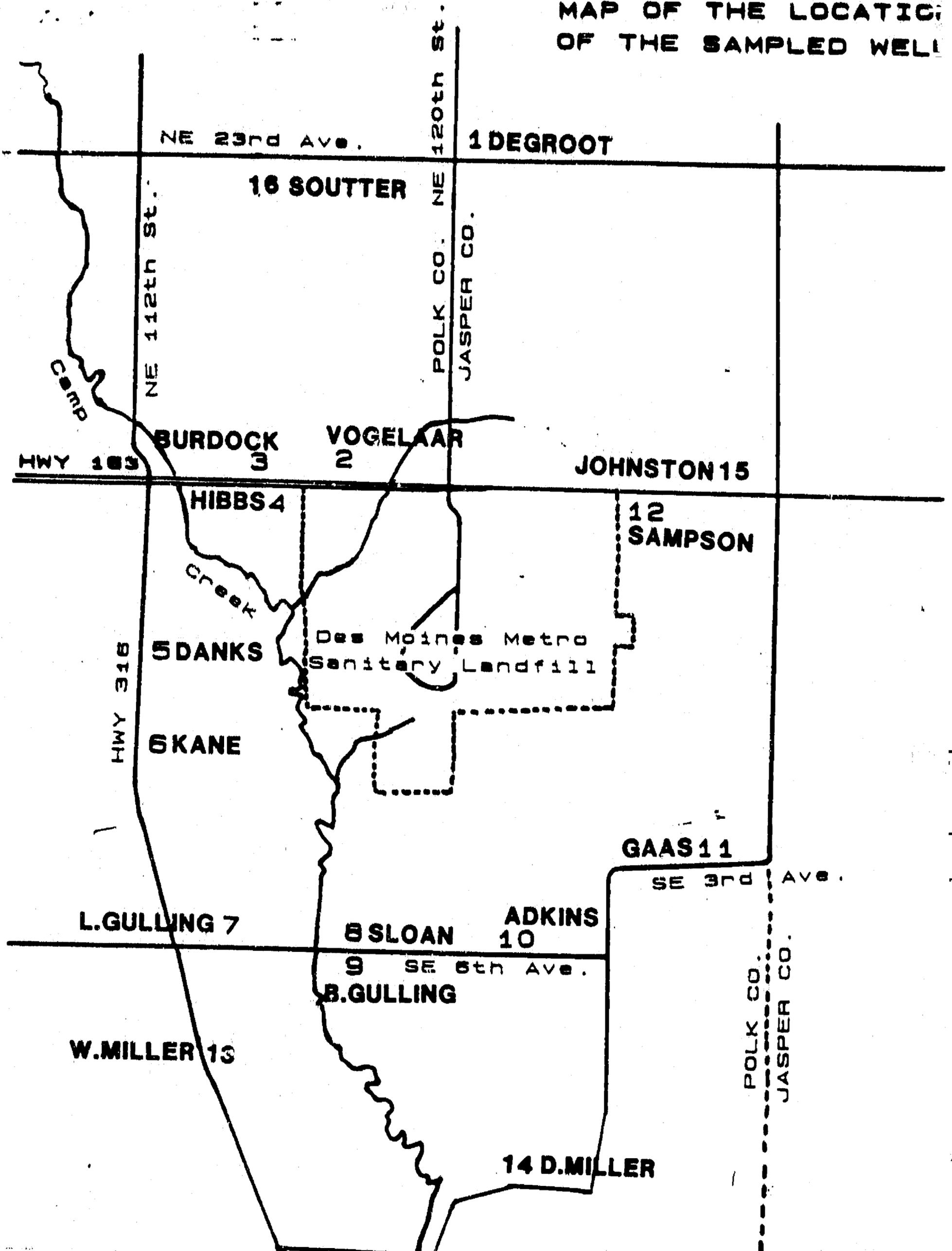
APPENDIX B



**METRO LANDFILL AREA
SURFACE SAMPLING POINTS**

APPENDIX C

MAP OF THE LOCATION
OF THE SAMPLED WELL



APPENDIX D

APPENDIX E

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8755400

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 N.A. Wallace Building
 Des Moines, IA 50319
 (315) 281-3271

Date Received: 05/21/87

Date of Report: 06/05/87

Submitter: EPD 3
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
 Date Collected: 05/26/87 09:05:00

Sample Description: WATER, SHALLOW WELL
 Client Reference:

Comments

FRED DE GROOT FARM. S-ST, S-DT, HAR_T, ALK_T, NA, NO2_N, CL,
 NA, HAR_T, NO2_N, CL, COND, SO4, MM, MG, CA, FE, K, CU, PB, HG, NI, AG, ETC.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	13 DEGREES C		
pH VALUE (LAB) -	7.2 pH UNITS	EPA 150.1	SMH
SPEC. CONDUCTANCE	1400 uMHOS @ 25 C	EPA 120.1	SMH
TOTAL ALKALINITY	344 MG/L AS CaCO3	EPA 310.1	SMH
TOTAL HARDNESS	480 MG/L AS CaCO3	EPA 120.3	DC
DISSOLVED SOLIDS	940 MG/L @100 C	EPA 150.1	JGT
SUSPENDED SOLIDS	<1 MG/L @100 C	EPA 140.2	JGT
CALCIUM	170 MG/L	EPA 200.7	SR
POTASSIUM	<0.1 MG/L	EPA 250.1	NL
SODIUM	19 MG/L	EPA 200.7	SR
CHLORIDE	37 MG/L	EPA 325.3	SMH
FLUORIDE	0.2 MG/L	USGS 14327	RWJ
SULFATE	130 MG/L	EPA 275.4	SMH
AMMONIA (AS N)	<0.1 MG/L	EPA 350.1	RLP
NO2+NO3 AS NO3-N	55 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMAND	10 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	NL
TOTAL BARIUM	0.15 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 210.2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

Date of Report
06/09/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Page No.
02

Analytical Report for Sample Number: 0755400

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	<0.01 MG/L	EPA 220.1	ML
TOTAL IRON	<0.02 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	63 MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	SMM
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01 MG/L	EPA 272.1	WL
TOTAL ZINC	0.00 MG/L	EPA 200.7	SR

Verified: *JAP*

PPM - Parts/Million
PPB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: DeGroot Farm # 1
Date Sample Collected: 5-20-87
Date Sample Received: 5-20-87

ANALYTICAL RESULTS

UHL Lab No. 8755408

<u>ANALYTE</u>	<u>CONCENTRATION (ug/L)</u>	<u>QUANTITATION LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: *[Signature]*
Date Reported: 6-11-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8733404

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 05/21/87

Date of Report: 06/05/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
 Date Collected: 05/20/87 09:45:00

Sample Description: WATER, PRIVATE WELL
 Client Reference:

Comments

ERNIE VOGELAAR, NEAR METRO EAST BLF. S_ST, S_DT, ALK_T, NA,
 HAR_T, NO2_N, CL, COND, PH, NH3, COD, SO4, MN, MG, CA, K, FE, AS, SA, ETC.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
-----	-----	-----	-----
TEMPERATURE	8 DEGREES C		
pH VALUE (LAB)	7.3 pH UNITS	EPA 150.1	SNM
SPEC. CONDUCTANCE	1300 uMHOS @ 25 C	EPA 120.1	SNM
TOTAL ALKALINITY	457 MG/L AS CaCO3	EPA 310.1	SNM
TOTAL HARDNESS	376 MG/L AS CaCO3	EPA 130.2	DC
DISSOLVED SOLIDS	800 MG/L @100 C	EPA 160.1	JGT
SUSPENDED SOLIDS	2 MG/L @100 C	EPA 160.2	JGT
CALCIUM	150 MG/L	EPA 200.7	SR
POTASSIUM	4.6 MG/L	EPA 250.1	ML
SODIUM	26 MG/L	EPA 200.7	SR
CHLORIDE	12 MG/L	EPA 325.3	SNM
FLUORIDE	0.35 MG/L	USGS 14327	RCV
SULFATE	140 MG/L	EPA 275.4	SNM
AMMONIA (AS N)	4.0 MG/L	EPA 350.1	NLP
NO2+NO3 AS NO3-N	14 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMD	10 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 204.2	ML
TOTAL BARIUM	0.07 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC

PPM - Parts/Million
 PPB - Parts/Billion
 (- Less than

MG/L - Milligrams/Liter
 uG/L - Micrograms/Liter
) - Greater than

MG/KG - Milligrams/Kilogram
 uG/KG - Micrograms/Kilogram
 pCi/L - pico Curies/Liter

Date of Report
06/08/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 0755404

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	<0.01 MG/L	EPA 320.1	ML
TOTAL IRON	0.09 MG/L	EPA 300.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 139.2	DC
TOTAL MAGNESIUM	49 MG/L	EPA 300.7	SR
TOTAL MANGANESE	<0.02 MG/L	EPA 300.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	SMH
TOTAL NICKEL	<0.05 MG/L	EPA 300.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 370.2	ML
TOTAL SILVER	<0.01 MG/L	EPA 372.1	ML
TOTAL ZINC	<0.02 MG/L	EPA 300.7	SR

Verified: *Jm*

PPM - Parts/Million
YPM - Parts/Million
< - Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Vogelaar Farm # 2
Date Sample Collected: 5-20-87
Date Sample Received: 5-20-87

ANALYTICAL RESULTS

UHL Lab No. 8255404

<u>ANALYTE</u>	<u>CONCENTRATION</u> <u>(ug/L)</u>	<u>QUANTITATION</u> <u>LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: *[Signature]*
Date Reported: 6-11-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8755402

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 N.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 06/21/87

Date of Report: 06/05/87

Submitter: EPD 3
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
 Date Collected: 05/20/87 10:30:00

Sample Description: WATER, SHALLOW WELL
 Client Reference:

Comments

DICK BURDOCK. S_ST, S_CT, ALK_T, NA, HAR_T, NOX_N, CL, COND, PH,
 NH3, COD, SO4, CA, K, FE, AS, BA, CD, CR, CU, PB, HG, NI, SE, AG, ZN, PL

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION		METHOD USED	ANALYST
-----	-----	-----	-----	-----
TEMPERATURE	9	DEGREES C		
pH VALUE (LAB)	7.7	pH UNITS	EPA 150.1	SMH
SPEC. CONDUCTANCE	2400	uMHGS @ 25 C	EPA 120.1	SMH
TOTAL ALKALINITY	460	MG/L AS CaCO3	EPA 310.1	SMH
TOTAL HARDNESS	1280	MG/L AS CaCO3	EPA 130.2	DC
DISSOLVED SOLIDS	1700	MG/L @100 C	EPA 140.1	JGT
SUSPENDED SOLIDS	2	MG/L @100 C	EPA 140.2	JGT
CALCIUM	300	MG/L	EPA 200.7	SR
POTASSIUM	0.3	MG/L	EPA 250.1	NL
SODIUM	21	MG/L	EPA 200.7	SR
CHLORIDE	57	MG/L	EPA 325.3	SMH
FLUORIDE	0.35	MG/L	UNGS 14327	RWV
SULFATE	270	MG/L	EPA 275.4	SMH
AMMONIA (AS N)	<0.1	MG/L	EPA 350.1	RLP
NO2+NO3 AS NO3-N	120	MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMD	20	MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01	MG/L	EPA 206.2	NL
TOTAL BARIUM	0.09	MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001	MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01	MG/L	EPA 218.2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pico Curies/Liter

Date of Report
04/25/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8755462

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	<0.01 MG/L	EPA 230.1	NL
TOTAL IRON	0.48 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	130 MG/L	EPA 260.7	SR
TOTAL MANGANESE	<0.02 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	SNK
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	NL
TOTAL SILVER	<0.01 MG/L	EPA 272.1	NL
TOTAL ZINC	0.40 MG/L	EPA 260.7	SR

Verified: *[Signature]*

PPM - Parts/Million MG/L - Milligrams/Liter MC/KG - Milligrams/Kilogram
PPM - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
< - Less than > - Greater than pCi/L - pic Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Burdock Shallow Well
Date Sample Collected: 5-20-87
Date Sample Received: 5-20-87

ANALYTICAL RESULTS

UHL Lab No. 8255402

<u>ANALYTE</u>	<u>CONCENTRATION (ug/L)</u>	<u>QUANTITATION LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: *[Signature]*
Date Reported: 6-11-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8733403

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4300

Des Moines Branch
 900 East Grand
 W.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 05/21/07

Date of Report: 06/05/07

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
 Date Collected: 05/20/07 11:00:00

Sample Description: WATER, DEEP WELL
 Client Reference:

Comments

PRIVATE WELL, DICK BURDOCK. S_ST, S_DT, ALK_T, NA, HAR_T, NOX_N,
 CL, COND, PH, NH3, COD, SO4, CA, K, FE, AS, BA, CR, CD, CU, PB, HG, NI, ETC.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	0 DEGREES C		
PH VALUE (LAB)	7.35 PH UNITS	EPA 150.1	SMH
SPEC. CONDUCTANCE	1500 UNITS @ 25 C	EPA 120.1	SMH
TOTAL ALKALINITY	461 MG/L AS CaCO3	EPA 310.1	SMH
TOTAL HARDNESS	493 MG/L AS CaCO3	EPA 130.2	DC
DISSOLVED SOLIDS	910 MG/L @100 C	EPA 160.1	JGT
SUSPENDED SOLIDS	44 MG/L @100 C	EPA 160.2	JGT
CALCIUM	100 MG/L	EPA 200.7	SR
POTASSIUM	9.4 MG/L	EPA 258.1	NL
SODIUM	110 MG/L	EPA 200.7	SR
CHLORIDE	4.5 MG/L	EPA 325.3	SMH
FLUORIDE	0.55 MG/L	USGS 14327	RWW
SULFATE	330 MG/L	EPA 275.4	SMH
AMMONIA (AS N)	11 MG/L	EPA 350.1	NLP
NO2+NO3 AS NO3-N	<0.1 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMD	46 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	NL
TOTAL BARIUM	<0.05 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 210.2	DC

PPM - Parts/Million
 PPB - Parts/Billion
 (- Less than

MG/L - Milligrams/Liter
 UG/L - Micrograms/Liter
) - Greater than

MG/KG - Milligrams/Kilogram
 UG/KG - Micrograms/Kilogram
 pCi/L - pico Curies/Liter

Date of Report
06/05/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8755403

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	<0.01 MG/L	EPA 230.1	NL
TOTAL IRON	14 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	59 MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.06 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	SMH
TOTAL NICKEL	<0.03 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 170.2	NL
TOTAL SILVER	<0.01 MG/L	EPA 272.1	NL
TOTAL ZINC	0.03 MG/L	EPA 200.7	SR

Verified: *JP*

PPM - Parts/Million
PPB - Parts/Billion
(- Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Burdock Deep Well
Date Sample Collected: 5-20-87
Date Sample Received: 5-20-87

ANALYTICAL RESULTS

UHL Lab No. 8255403

<u>ANALYTE</u>	<u>CONCENTRATION (ug/L)</u>	<u>QUANTITATION LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	2	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: *JS*
Date Reported: 6-11-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 0755401

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 W.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5871

Date Received: 05/21/87

Date of Report: 06/08/87

Submitter: EPD S
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
 Date Collected: 05/20/87 11:10:00

Sample Description: WATER, SHALLOW WELL
 Client Reference:

Comments

MRS. BILL HINNS RESIDENCE. S_ST, S_DT, ALK_T, NA, HAR_T, MOX_N,
 CL, COND, PH, NH3, COD, SO4, CA, K, FE, AS, BA, CD, CR, CU, PB, HG, NI, ETC.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
-----	-----	-----	-----
TEMPERATURE	7 DEGREES C		
pH VALUE (LAB)	7.3 pH UNITS	EPA 150.1	SMH
SPEC. CONDUCTANCE	700 uMHOS @ 25 C	EPA 120.1	SMH
TOTAL ALKALINITY	334 MG/L AS CaCO3	EPA 310.1	SMH
TOTAL HARDNESS	352 MG/L AS CaCO3	EPA 130.2	DC
DISSOLVED SOLIDS	400 MG/L @100 C	EPA 140.1	JGT
SUSPENDED SOLIDS	2 MG/L @100 C	EPA 160.2	JGT
CALCIUM	88 MG/L	EPA 200.7	NR
POTASSIUM	<0.1 MG/L	EPA 250.1	NL
SODIUM	7.6 MG/L	EPA 200.7	SR
CHLORIDE	9.0 MG/L	EPA 325.2	SMH
FLUORIDE	0.4 MG/L	USCS 14327	RWV
SULFATE	37 MG/L	EPA 275.4	SMH
AMMONIA (AS N)	<0.1 MG/L	EPA 350.1	RLP
NO2+NO3 AS NO3-N	<0.1 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMD	4 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	NL
TOTAL BARIUM	0.15 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC

PPM - Parts/Million
 PPB - Parts/Billion
 (- Less than

MG/L - Milligrams/Liter
 uG/L - Micrograms/Liter
) - Greater than

MG/KG - Milligrams/Kilogram
 uG/KG - Micrograms/Kilogram
 pCi/L - pico Curies/Liter

Date of Report
06/02/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8755401

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	<0.01 MG/L	EPA 220.1	NL
TOTAL IRON	0.50 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	32 MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	SMH
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	NL
TOTAL SILVER	<0.01 MG/L	EPA 272.1	NL
TOTAL ZINC	0.74 MG/L	EPA 200.7	SR

Verified: *FA*

PPM - Parts/Million
PPB - Parts/Billion
(- Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
) - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Hibbs Farm # 4
Date Sample Collected: 5-20-87
Date Sample Received: 5-20-87

ANALYTICAL RESULTS

UHL Lab No. 8755401

<u>ANALYTE</u>	<u>CONCENTRATION</u> <u>(ug/L)</u>	<u>QUANTITATION</u> <u>LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: 
Date Reported: 6-11-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8753406

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 05/21/87

Date of Report: 06/03/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
 Date Collected: 05/20/87 11:45:00

Sample Description: WATER, SHALLOW WELL
 Client Reference:

Comments

EVELYN DANKS FARM. S_ST, S_DT, HAR_T, ALK_T, NA, NOX_N, CL,
 CL, COND, PH, NH3, COD, SO4, CA, K, FE, AS, BA, CD, CR, CU, PB, MG, NI, ETC.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	7 DEGREE C		
PH VALUE (LAB)	7.35 pH UNITS	EPA 150.1	SMH
SPEC. CONDUCTANCE	4200 uMHOS @ 25 C	EPA 120.1	SMH
TOTAL ALKALINITY	265 MG/L AS CaCO3	EPA 310.1	SMH
TOTAL HARDNESS	1210 MG/L AS CaCO3	EPA 130.2	DC
DISSOLVED SOLIDS	3500 MG/L @100 C	EPA 160.1	JGT
SUSPENDED SOLIDS	27 MG/L @100 C	EPA 160.2	JGT
CALCIUM	320 MG/L	EPA 200.7	SR
POTASSIUM	12 MG/L	EPA 250.1	NL
SODIUM	490 MG/L	EPA 200.7	SR
CHLORIDE	49 MG/L	EPA 325.3	SMH
FLUORIDE	2.3 MG/L	USGS 14327	NWV
SULFATE	2100 MG/L	EPA 270.4	SMH
AMMONIA (AS N)	2.3 MG/L	EPA 350.1	RFP
NO2+NO3 AS NO3-N	<0.1 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMD	10 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	NL
TOTAL BARIUM	<0.05 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 210.2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MC/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter NG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

Date of Report
06/05/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8735406

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	<0.01 MG/L	EPA 220.1	HL
TOTAL IRON	13 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	100 MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.13 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	SMM
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 279.2	HL
TOTAL SILVER	<0.01 MG/L	EPA 272.1	HL
TOTAL ZINC	0.05 MG/L	EPA 200.7	SR

Verified: *TR*

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
(- Less than) - Greater than pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Danks Farm # 5 - Shallow
Date Sample Collected: 5-20-87
Date Sample Received: 5-20-87

ANALYTICAL RESULTS

UHL Lab No. 8755406

<u>ANALYTE</u>	<u>CONCENTRATION (ug/L)</u>	<u>QUANTITATION LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Noder/J. Filkins
Verified: *[Signature]*
Date Reported: 6-11-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8753485

Iowa City Laboratory
 Oakdale Mall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 700 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 05/21/87

Date of Report: 06/05/87

Submitter: EPD 3
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
 Date Collected: 05/29/87

Sample Description: WATER, DEEP WELL
 Client Reference:

Comments

EVELYN DANKS FARM. S_ST, S_DT, HAR_T, ALK_T, NA, NOX_N, CL,
 COND, PH, MNS, COD, SO4, AS, SA, CD, CR, CU, FE, HG, NI, SE, AG, ZN, PL, ETC.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	11 DEGREES C		
pH VALUE (LAB)	7.2 pH UNITS	EPA 150.1	SMH
SPEC. CONDUCTANCE	1300 uMHOS @ 25 C	EPA 120.1	SMH
TOTAL ALKALINITY	324 MG/L AS CaCO3	EPA 310.1	SMH
TOTAL HARDNESS	413 MG/L AS CaCO3	EPA 130.2	DC
DISSOLVED SOLIDS	790 MG/L @100 C	EPA 140.1	JGT
SUSPENDED SOLIDS	1 MG/L @100 C	EPA 140.2	JGT
CALCIUM	140 MG/L	EPA 200.7	SR
POTASSIUM	2.1 MG/L	EPA 250.1	HL
SODIUM	18 MG/L	EPA 200.7	SR
CHLORIDE	73 MG/L	EPA 325.3	SMH
FLUORIDE	0.3 MG/L	USGS 14327	RWV
SULFATE	130 MG/L	EPA 275.4	SMH
AMMONIA (AS N)	0.1 MG/L	EPA 350.1	RLP
NO2+NO3 AS NO3-N	9.8 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMD	17 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 204.2	HL
TOTAL BARIUM	0.00 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 210.2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

Date of Report
06/05/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Page No.
02

Analytical Report for Sample Number 8755485

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	<0.01 MG/L	EPA 230.1	NL
TOTAL IRON	0.24 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	64 MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	SM
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	NL
TOTAL SILVER	<0.01 MG/L	EPA 272.1	NL
TOTAL ZINC	0.03 MG/L	EPA 200.7	SR

Verified: *JIP*

PPM - Parts/Million MG/L - Milligrams/Liter MC/KG - Milligrams/Kilogram
PPB - Parts/Billion µG/L - Micrograms/Liter µG/KG - Micrograms/Kilogram
< - Less than) - Greater than pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Danks Farm # 5 - Deep Well
Date Sample Collected: 5-20-87
Date Sample Received: 5-20-87

ANALYTICAL RESULTS

UHL Lab No. 8755405

<u>ANALYTE</u>	<u>CONCENTRATION</u> <u>(ug/L)</u>	<u>QUANTITATION</u> <u>LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Mader/J. Filkins
Verified: *[Signature]*
Date Reported: 6-11-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 4755487

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 05/21/87

Date of Report: 06/03/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
 Date Collected: 03/20/87

Sample Description: WATER, SHALLOW WELL
 Client Reference:

Comments

EVILYN DANKS FARM, PASTURE WELL, S-ST, S-DT, HAR_T, ALK_T, NA,
 HAR_T, NO2_N, CL, COND, PH, NH3, COD, SO4, CA, K, /E, AS, BA, CD, CR, ETC.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	7 DEGREES C		
PH VALUE (LAB) -	6.95 PH UNITS	EPA 150.1	SMH
SPEC. CONDUCTANCE	430 uMHOS @ 25 C	EPA 120.1	SMH
TOTAL ALKALINITY	139 MG/L AS CaCO3	EPA 310.1	SMH
TOTAL HARDNESS	183 MG/L AS CaCO3	EPA 130.2	DC
DISSOLVED SOLIDS	280 MG/L @100 C	EPA 160.1	JGT
SUSPENDED SOLIDS	4 MG/L @100 C	EPA 160.2	JGT
CALCIUM	47 MG/L	EPA 200.7	SR
POTASSIUM	0.4 MG/L	EPA 250.1	HL
SODIUM	0.6 MG/L	EPA 200.7	SR
CHLORIDE	0.0 MG/L	EPA 325.3	SMH
FLUORIDE	0.2 MG/L	USGS 14327	RWW
SULFATE	29 MG/L	EPA 275.4	SMH
AMMONIA (AS N)	<0.1 MG/L	EPA 350.1	RLP
NO2+NO3 AS NO3-N	7.6 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMD	3 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	HL
TOTAL BARIUM	0.07 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC

PPM - Parts/Million
 PPB - Parts/Billion
 < - Less than

MG/L - Milligrams/Liter
 uG/L - Micrograms/Liter
) - Greater than

MG/KG - Milligrams/Kilogram
 uG/KG - Micrograms/Kilogram
 pCi/L - pico Curies/Liter

Date of Report
04/08/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8755407

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	<0.01 MG/L	EPA 220.1	ML
TOTAL IRON	0.18 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	14 MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.17 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	SMH
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01 MG/L	EPA 272.1	ML
TOTAL ZINC	0.08 MG/L	EPA 200.7	SR

Verified: *JMA*

PPM - Parts/Million
PPB - Parts/Billion
(- Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
) - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Danks Farm # 5 - Pasture Shallow
Date Sample Collected: 5-20-87
Date Sample Received: 5-20-87

ANALYTICAL RESULTS

UHL Lab No. 8755407

<u>ANALYTE</u>	<u>CONCENTRATION</u> <u>(ug/L)</u>	<u>QUANTITATION</u> <u>LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkin
Verified: *[Signature]*
Date Reported: 6-11-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8755489

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4388

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-3371

Date Received: 03/21/87

Date of Report: 04/05/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
 Date Collected: 03/20/87 02:00:00

Sample Description: WATER
 Client Reference:

Comments

KANE FARM. S-ST, S-DT, HAR_T, ALK_T, NA, NOX_N, CL, NA, COND, PH,
 COD, SO4, CA, K, FE, AS, BA, CD, CR, CU, PB, HG, NI, SE, AG, ZN, PL

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	7 DEGREES C		
pH VALUE (LAB)	7.2 pH UNITS	EPA 150.1	SMH
SPEC. CONDUCTANCE	430 uMHOS @ 25 C	EPA 120.1	SMH
TOTAL ALKALINITY	271 MG/L AS CaCO3	EPA 210.1	SMH
TOTAL HARDNESS	206 MG/L AS CaCO3	EPA 130.2	DC
DISSOLVED SOLIDS	350 MG/L @100 C	EPA 160.1	JGT
SUSPENDED SOLIDS	5 MG/L @100 C	EPA 160.2	JGT
CALCIUM	80 MG/L	EPA 200.7	SR
POTASSIUM	1.0 MG/L	EPA 250.1	HL
SODIUM	15 MG/L	EPA 200.7	SR
CHLORIDE	11 MG/L	EPA 325.3	SMH
FLUORIDE	0.5 MG/L	USGS 14327	RWV
SULFATE	36 MG/L	EPA 275.4	SMH
AMMONIA (AS N)	<0.1 MG/L	EPA 350.1	RLP
NO2+NO3 AS NO3-N	<0.1 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMD	3 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	HL
TOTAL BARIUM	<0.05 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 210.2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

Date of Report
06/08/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 0733409

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYST
-----	-----	-----	-----
TOTAL COPPER	<0.01 MG/L	EPA 210.1	NL
TOTAL IRON	1.7 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	21 MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.39 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 243.1	SPM
TOTAL NICKEL	<0.03 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	NL
TOTAL SILVER	<0.01 MG/L	EPA 272.1	NL
TOTAL ZINC	0.03 MG/L	EPA 200.7	SR

Verified: *JTP*

PPM - Parts/Million
PPB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Kane Farm # 6
Date Sample Collected: 5-20-87
Date Sample Received: 5-20-87

ANALYTICAL RESULTS

UHL Lab No. 8755409

<u>ANALYTE</u>	<u>CONCENTRATION (ug/L)</u>	<u>QUANTITATION LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkir
Verified: 
Date Reported: 6-11-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8755438

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 05/21/87

Date of Report: 06/08/87

Submitter: LPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUNNELLS
 Date Collected: 05/21/87 09:10:00

Sample Description: WATER, SHALLOW WELL
 Client Reference:

Comments

L, CULLING, S_DT, S_ST, ALK_T, NA, HAR_T, NOX_N, CL, COND, CU, PB, HG,
 PH, NH3, COD, SO4, CA, K, FE, AS, BA, CD, CR, NI, SE, AG, MN, MG, TEMP.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	13 DEGREES C		
pH VALUE (LAB)	7.0 pH UNITS	EPA 150.1	BMM
SPEC. CONDUCTANCE	730 uMHOS @ 25 C	EPA 120.1	BMM
TOTAL ALKALINITY	224 MG/L AS CaCO3	EPA 310.1	BMM
TOTAL HARDNESS	329 MG/L AS CaCO3	EPA 190.2	DC
DISSOLVED SOLIDS	390 MG/L @180 C	EPA 160.1	JGT
SUSPENDED SOLIDS	2 MG/L @103 C	EPA 160.2	JGT
CALCIUM	100 MG/L	EPA 215.2	SR
POTASSIUM	<0.1 MG/L	EPA 250.1	HL
SODIUM	12 MG/L	EPA 200.7	SR
CHLORIDE	26 MG/L	EPA 325.3	BMM
FLUORIDE	0.45 MG/L	USGS 14327	RWW
SULFATE	76 MG/L	EPA 275.4	BMM
AMMONIA (AS N)	<0.1 MG/L	EPA 350.1	RFP
NO2+NO3 AS NO3-N	6.9 MG/L	EPA 353.2	JAC
CHEMICAL OXYGEN DEMD	7 MG/L	EPA 410.1	JAC
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	HL
TOTAL BARIUM	0.00 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 310.2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

Date of Report
04/08/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8755450

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	<0.01 MG/L	EPA 220.1	NL
TOTAL IRON	0.07 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	17 MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	SMH
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	NL
TOTAL SILVER	<0.01 MG/L	EPA 273.1	NL
TOTAL ZINC	0.19 MG/L	EPA 200.7	SR

Verified:



PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
PPB - Parts/Billion µG/L - Micrograms/Liter µG/KG - Micrograms/Kilogram
(- Less than) - Greater than pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Metro East Area, L Gulling shallow well #1
Date Sample Collected: 5-21-87
Date Sample Received: 5-21-87

ANALYTICAL RESULTS

UHL Lab No. 8755458

<u>ANALYTE</u>	<u>CONCENTRATION (ug/L)</u>	<u>QUANTITATION LIMIT (ug/L)</u>
<u>VINYL CHLORIDE</u>	<u><1</u>	<u>1</u>
<u>1,1-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CIS- & TRANS-1,2-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CHLOROFORM</u>	<u><1</u>	<u>1</u>
<u>1,1,1-TRICHLOROETHANE</u>	<u><1</u>	<u>1</u>
<u>CARBON TETRACHLORIDE</u>	<u><1</u>	<u>1</u>
<u>BROMODICHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>TRICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>DIBROMOCHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>BENZENE</u>	<u><1</u>	<u>1</u>
<u>BROMOFORM</u>	<u><1</u>	<u>1</u>
<u>1,4-DICHLOROBENZENE</u>	<u><1</u>	<u>1</u>

Analytical Method: EPA Method 624

Analyst: J. Joder/J. Filkir
Verified: 
Date Reported: 6-11-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8755400

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 05/31/87

Date of Report: 06/05/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUMMELLS
 Date Collected: 05/20/87 02:30:00

Sample Description: WATER, SHALLOW WELL
 Client Reference: CRCURICH

Comments

FRANK SLOAN FARM, PRIVATE. S_ST, S_DT, ALK_T, NA, HAR_T, NOX_M, CL,
 COND, PH, NH3, COD, SO4, CA, K, FE, AS, BA, CD, CR, CU, PB, HG, NI, SE, AG.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
-----	-----	-----	-----
TEMPERATURE	7 DEGREES C		
pH VALUE (LAB)	6.1 pH UNITS	EPA 150.1	SMH
SPEC. CONDUCTANCE	350 uMHOM @ 25 C	EPA 120.1	SMH
TOTAL ALKALINITY	59.0 MG/L AS CaCO3	EPA 310.1	SMH
TOTAL HARDNESS	138 MG/L AS CaCO3	EPA 130.2	DC
DISSOLVED SOLIDS	260 MG/L @180 C	EPA 140.1	JGT
SUSPENDED SOLIDS	8 MG/L @103 C	EPA 140.2	JGT
CALCIUM	32 MG/L	EPA 200.7	SR
POTASSIUM	<0.1 MG/L	EPA 250.1	NL
SODIUM	9.5 MG/L	EPA 200.7	SR
CHLORIDE	26 MG/L	EPA 325.3	SMH
FLUORIDE	0.15 MG/L	USGS 14327	RWW
SULFATE	39 MG/L	EPA 375.4	SMH
AMMONIA (AS N)	<0.1 MG/L	EPA 350.1	RFP
NO2+NO3 AS NO3-N	6.2 MG/L	EPA 352.2	JAC
CHEMICAL OXYGEN DEMAND	12 MG/L	EPA 410.1	JAC
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	NL
TOTAL BARIUM	0.16 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 313.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 210.2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

Date of Report
06/03/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 0753400

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	<0.01 MG/L	EPA 220.1	HL
TOTAL IRON	0.26 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	14 MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.03 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	SMH
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	HL
TOTAL SILVER	<0.01 MG/L	EPA 272.1	HL
TOTAL ZINC	0.09 MG/L	EPA 200.7	SR

Verified: *JA*

PPM - Parts/Million
PPB - Parts/Billion
(- Less than

MG/L - Milligrams/Liter
uG/L - Micrograms/Liter
) - Greater than

MG/KG - Milligrams/Kilogram
uG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Frank Sloan Well
Date Sample Collected: 5-20-87
Date Sample Received: 5-20-87

ANALYTICAL RESULTS

UHL Lab No. 8755400

<u>ANALYTE</u>	<u>CONCENTRATION (ug/L)</u>	<u>QUANTITATION LIMIT (ug/L)</u>
<u>VINYL CHLORIDE</u>	<u><1</u>	<u>1</u>
<u>1,1-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CIS- & TRANS-1,2-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CHLOROFORM</u>	<u><1</u>	<u>1</u>
<u>1,1,1-TRICHLOROETHANE</u>	<u><1</u>	<u>1</u>
<u>CARBON TETRACHLORIDE</u>	<u><1</u>	<u>1</u>
<u>BROMODICHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>TRICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>DIBROMOCHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>BENZENE</u>	<u><1</u>	<u>1</u>
<u>BROMOFORM</u>	<u><1</u>	<u>1</u>
<u>1,4-DICHLOROBENZENE</u>	<u><1</u>	<u>1</u>

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: *JF*
Date Reported: 6-11-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8785459

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 700 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 05/21/67

Date of Report: 06/08/67

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUMNELLS
 Date Collected: 05/21/67 09:30:00

Sample Description: WATER, SHALLOW WELL
 Client Reference:

Comments

B, GULLING, S_DT, S_ST, ALK_T, NA, NH3_T, NOX_N, CL, COND, CU, PB, HG,
 PH, NH3, COO, SO4, CA, K, FE, AS, BA, CD, CR, NI, SE, AG, MN, MG, TEMP.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	12 DEGREES C		
pH VALUE (LAB)	7.1 pH UNITS	EPA 150.1	SMH
SPEC. CONDUCTANCE	320 uMHOS @ 25 C	EPA 120.1	SMH
TOTAL ALKALINITY	170 MG/L AS CaCO3	EPA 310.1	SMH
TOTAL HARDNESS	237 MG/L AS CaCO3	EPA 130.2	PC
DISSOLVED SOLIDS	300 MG/L @100 C	EPA 140.1	JGT
SUSPENDED SOLIDS	<1 MG/L @103 C	EPA 140.2	JGT
CALCIUM	52 MG/L	EPA 213.2	SR
POTASSIUM	<0.1 MG/L	EPA 250.1	ML
SODIUM	10 MG/L	EPA 200.7	SR
CHLORIDE	7.5 MG/L	EPA 325.3	SMH
FLUORIDE	0.35 MG/L	USGS 14327	RWV
SULFATE	40 MG/L	EPA 275.4	SMH
AMMONIA (AS N)	<0.1 MG/L	EPA 350.1	RLP
NO2+NO3 AS NO3-N	7.4 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMD	3 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	ML
TOTAL BARIUM	0.12 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 216.2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

Date of Report
06/09/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY
Analytical Report for Sample Number 8733459

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	0.02 MG/L	EPA 230.1	ML
TOTAL IRON	0.02 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	26 MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.02 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	SMH
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 276.2	ML
TOTAL SILVER	<0.01 MG/L	EPA 272.1	ML
TOTAL ZINC	0.01 MG/L	EPA 200.7	SR

Verified: 

PPM - Parts/Million
PPB - Parts/Billion
(- less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
) - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Metro East Area, B Gulling shallow well
Date Sample Collected: 5-21-87
Date Sample Received: 5-21-87

ANALYTICAL RESULTS

UHL Lab No. 8755459

<u>ANALYTE</u>	<u>CONCENTRATION</u> <u>(ug/L)</u>	<u>QUANTITATION</u> <u>LIMIT (ug/L)</u>
<u>VINYL CHLORIDE</u>	<u><1</u>	<u>1</u>
<u>1,1-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CIS- & TRANS-1,2-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CHLOROFORM</u>	<u><1</u>	<u>1</u>
<u>1,1,1-TRICHLOROETHANE</u>	<u><1</u>	<u>1</u>
<u>CARBON TETRACHLORIDE</u>	<u><1</u>	<u>1</u>
<u>BROMODICHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>TRICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>DIBROMOCHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>BENZENE</u>	<u><1</u>	<u>1</u>
<u>BROMOFORM</u>	<u><1</u>	<u>1</u>
<u>1,4-DICHLOROBENZENE</u>	<u><1</u>	<u>1</u>

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkin
Verified: *[Signature]*
Date Reported: 6-11-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8755460

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 05/21/87

Date of Report: 06/08/87

Submitter: EPD
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUNNELLS
 Date Collected: 05/21/87

Sample Description: WATER, SHALLOW WELL
 Client Reference:

Comments

B. GULLING PASTURE. S_DT, S_ST, ALK_T, NA, HAR_T, NOX_N, CL, COND,
 PH, NH3, COD, SO4, CA, K, FE, AS, BA, CD, CR, CU, PB, NI, HG, SE, AG, ETC.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	7 DEGREES C		
PH VALUE (LAB)	7.1 PH UNITS	EPA 150.1	SMM
SPEC. CONDUCTANCE	880 uMHOS @ 25 C	EPA 120.1	SMM
TOTAL ALKALINITY	189 MG/L AS CaCO3	EPA 310.1	SMM
TOTAL HARDNESS	379 MG/L AS CaCO3	EPA 130.2	DC
DISSOLVED SOLIDS	500 MG/L @180 C	EPA 140.1	JGT
SUSPENDED SOLIDS	1 MG/L @103 C	EPA 140.2	JGT
CALCIUM	86 MG/L	EPA 215.2	SR
POTASSIUM	2.0 MG/L	EPA 258.1	NL
SODIUM	17 MG/L	EPA 200.7	SR
CHLORIDE	45 MG/L	EPA 325.3	SMM
FLUORIDE	0.3 MG/L	USGS 14327	RWW
SULFATE	91 MG/L	EPA 275.4	SMM
AMMONIA (AS N)	<0.1 MG/L	EPA 350.1	RLP
NO2+NO3 AS NO3-N	26 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMAND	7 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 204.2	NL
TOTAL BARIUM	0.10 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pice Curies/Liter

Date of Report
06/08/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Page #
02

Analytical Report for Sample Number 8735440

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	<0.01 MG/L	EPA 220.1	ML
TOTAL IRON	0.10 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	40 MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.02 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	SMH
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01 MG/L	EPA 272.1	ML
TOTAL ZINC	0.05 MG/L	EPA 200.7	SR

Verified: 

PPM - Parts/Million MG/L - Milligrams/Liter MC/KG - Milligrams/Kilogram
PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
(- Less than) - Greater than pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Metro East Area, B Gulling pasture shallow well
Date Sample Collected: 5-21-87
Date Sample Received: 5-21-87

ANALYTICAL RESULTS

UHL Lab No. 8255460

ANALYTE	CONCENTRATION (ug/L)	QUANTITATION LIMIT (ug/L)
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Hoder/J. Filkin
Verified: 
Date Reported: 6-11-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8755399

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4506

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 03/21/87

Date of Report: 04/05/87

Submitter: EPD 3
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUMMELLS
 Date Collected: 03/20/87 03:00:00

Sample Description: WATER, SHALLOW WELL
 Client Reference:

Comments

JIM ADKINS, S_ST, S_DT, ALK_T, NA, HAR_T, NO2_N, CL, COND, PH, NH3,
 COD, SO4, CA, K, FE, AS, BA, CD, CR, CU, PB, HG, NI, SE, AG.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
-----	-----	-----	-----
TEMPERATURE	7 DEGREE C		
PH VALUE (LAB)	7.35 pH UNITS	EPA 150.1	SHM
SPEC. CONDUCTANCE	580 uMHOS @ 25 C	EPA 120.1	SHM
TOTAL ALKALINITY	150 MG/L AS CaCO3	EPA 310.1	SHM
TOTAL HARDNESS	265 MG/L AS CaCO3	EPA 130.2	DC
DISSOLVED SOLIDS	330 MG/L @100 C	EPA 160.1	JGT
SUSPENDED SOLIDS	1 MG/L @103 C	EPA 160.2	JGT
CALCIUM	65 MG/L	EPA 200.7	SR
POTASSIUM	<0.1 MG/L	EPA 230.1	HL
SODIUM	6.2 MG/L	EPA 200.7	SR
CHLORIDE	16 MG/L	EPA 323.3	SHM
FLUORIDE	0.35 MG/L	USGS 14327	KWV
SULFATE	27 MG/L	EPA 275.4	SHM
AMMONIA (AS N)	<0.1 MG/L	EPA 350.1	RLP
NO2+NO3 AS NO3-N	20 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMD	4 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	HL
TOTAL BARIUM	0.13 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

Date of Report
06/05/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Page No.

02

Analytical Report for Sample Number 8755399

TEST	CONCENTRATION		METHOD USED	ANALYST
TOTAL COPPER	0.02	MG/L	EPA 220.1	NL
TOTAL IRON	0.05	MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01	MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	29	MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02	MG/L	EPA 200.7	NL
TOTAL MERCURY	<0.001	MG/L	EPA 245.1	SMH
TOTAL NICKEL	<0.05	MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01	MG/L	EPA 270.2	NL
TOTAL SILVER	<0.01	MG/L	EPA 272.1	NL
TOTAL ZINC	0.03	MG/L	EPA 200.7	SR

Verified:

LF

PPM - Parts/Million
PPB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: J. Adkins Farm
Date Sample Collected: 5-20-87
Date Sample Received: 5-20-87

ANALYTICAL RESULTS

UHL Lab No. 8255399

<u>ANALYTE</u>	<u>CONCENTRATION (ug/L)</u>	<u>QUANTITATION LIMIT (ug/L)</u>
<u>VINYL CHLORIDE</u>	<u><1</u>	<u>1</u>
<u>1,1-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CIS- & TRANS-1,2-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CHLOROFORM</u>	<u><1</u>	<u>1</u>
<u>1,1,1-TRICHLOROETHANE</u>	<u><1</u>	<u>1</u>
<u>CARBON TETRACHLORIDE</u>	<u><1</u>	<u>1</u>
<u>BROMODICHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>TRICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>DIBROMOCHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>BENZENE</u>	<u><1</u>	<u>1</u>
<u>BROMOFORM</u>	<u><1</u>	<u>1</u>
<u>1,4-DICHLOROBENZENE</u>	<u><1</u>	<u>1</u>

Analytical Method: EPA Method 624

Analyst: J. Guder/J. Filkins
Verified: *[Signature]*
Date Reported: 6-11-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8755461

Iowa City Laboratory
Oakdale Hall
Iowa City, IA 52242
(319) 335-4500

Des Moines Branch
900 East Grand
H.A. Wallace Building
Des Moines, IA 50317
(515) 281-3371

Date Received: 05/21/87

Date of Report: 06/08/87

Submitter: EPD 5
Address: WALLACE BLDG
City: DES MOINES, IA 50319

Sample Location: RUMMELLS
Date Collected: 05/21/87 10:00:00

Sample Description: WATER, DEEP WELL
Client Reference:

Comments

GAAS RESIDENCE. S_DT, S_ST, ALK_T, NA, HAR_T, NOX_N, CL, COND,
PH, NH3, COD, SO4, CA, K, FE, AS, BA, CD, CR, CU, PB, HG, NI, SE, AG, ETC.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	6 DEGREES C		
pH VALUE (LAB)	7.7 pH UNITS	EPA 150.1	SMH
SPEC. CONDUCTANCE	1800 uMHOS @ 25 C	EPA 120.1	SMH
TOTAL ALKALINITY	413 MG/L AS CaCO3	EPA 310.1	SMH
TOTAL HARDNESS	526 MG/L AS CaCO3	EPA 130.2	DC
DISSOLVED SOLIDS	1150 MG/L @100 C	EPA 140.1	JGT
SUSPENDED SOLIDS	50 MG/L @100 C	EPA 140.2	JGT
CALCIUM	100 MG/L	EPA 215.2	SR
POTASSIUM	12 MG/L	EPA 230.1	ML
SODIUM	180 MG/L	EPA 200.7	SR
CHLORIDE	4.0 MG/L	EPA 325.3	SMH
FLUORIDE	0.85 MG/L	UNGS 14327	RWV
SULFATE	600 MG/L	EPA 275.4	SMH
AMMONIA (AS N)	4.4 MG/L	EPA 350.1	RLP
NO2+NO3 AS NO3-N	<0.1 MG/L	EPA 353.3	JAG
CHEMICAL OXYGEN DEMD	10 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	ML
TOTAL BARIUM	<0.05 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 210.2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

Date of Report
06/08/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8755461

Page No.
02

TEST	CONCENTRATION		METHOD USED	ANALYST
-----	-----	-----	-----	-----
TOTAL COPPER	0.14	MG/L	EPA 220.1	ML
TOTAL IRON	29	MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01	MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	47	MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.27	MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001	MG/L	EPA 245.1	SMH
TOTAL NICKEL	<0.03	MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01	MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01	MG/L	EPA 272.1	ML
TOTAL ZINC	1.6	MG/L	EPA 200.7	SR

Verified:



PPM - Parts/Million
PPB - Parts/Billion
(- Less than

MG/L - Milligram/Liter
UG/L - Micrograms/Liter
) - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Metro East Area, H Gas Farm deep well
Date Sample Collected: 5-21-87
Date Sample Received: 5-21-87

ANALYTICAL RESULTS

UHL Lab No. 8255461

<u>ANALYTE</u>	<u>CONCENTRATION</u> <u>(ug/L)</u>	<u>QUANTITATION</u> <u>LIMIT (ug/L)</u>
<u>VINYL CHLORIDE</u>	<u><1</u>	<u>1</u>
<u>1,1-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CIS- & TRANS-1,2-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CHLOROFORM</u>	<u><1</u>	<u>1</u>
<u>1,1,1-TRICHLOROETHANE</u>	<u><1</u>	<u>1</u>
<u>CARBON TETRACHLORIDE</u>	<u><1</u>	<u>1</u>
<u>BROMODICHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>TRICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>DIBROMOCHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>BENZENE</u>	<u><1</u>	<u>1</u>
<u>BROMOFORM</u>	<u><1</u>	<u>1</u>
<u>1,4-DICHLOROBENZENE</u>	<u><1</u>	<u>1</u>

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: *[Signature]*
Date Reported: 6-11-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8753462

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 N.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-3371

Date Received: 05/21/87

Date of Report: 06/08/87

Submitter: EPD 3
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUMBLELLS
 Date Collected: 05/21/87 10:00:00

Sample Description: WATER, SHALLOW WELL
 Client Reference:

Comments

GAAS RESIDENCE. S_DT, S_ST, ALK_T, NA, NA_T, NOX_N, CL, COND, CU,
 PH, MKS, COD, SO4, CA, K, FE, AS, SA, CD, CR, PB, HG, NI, SE, AG, MN, ETC.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
-----	-----	-----	-----
TEMPERATURE	9 DEGREES C		
PH VALUE (LAB)	7.5 PH UNITS	EPA 150.1	SMH
SPEC. CONDUCTANCE	1100 UMHOS @ 25 C	EPA 120.1	SMH
TOTAL ALKALINITY	272 MG/L AS CaCO3	EPA 310.1	SMH
TOTAL HARDNESS	497 MG/L AS CaCO3	EPA 130.2	DC
DISSOLVED SOLIDS	730 MG/L @100 C	EPA 160.1	JGT
SUSPENDED SOLIDS	<1 MG/L @100 C	EPA 160.2	JGT
CALCIUM	120 MG/L	EPA 215.2	SR
POTASSIUM	0.4 MG/L	EPA 250.1	NL
SODIUM	40 MG/L	EPA 200.7	SR
CHLORIDE	32 MG/L	EPA 325.3	SMH
FLUORIDE	0.4 MG/L	USCS 14327	NWV
SULFATE	340 MG/L	EPA 275.4	SMH
AMMONIA (AS N)	<0.1 MG/L	EPA 350.1	RLP
NO2+NO3 AS NO3-N	17 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMD	10 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 204.2	NL
TOTAL BARIUM	0.00 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 210.2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion UG/L - Micrograms/Liter UG/KG - Micrograms/Kilogram
 (- Less than) - Greater than PC/L - p/sec Curies/Liter

Date of Report
04/08/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8755462

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	0.18 MG/L	EPA 220.1	NL
TOTAL IRON	0.03 MG/L	EPA 200.7	SR
TOTAL LEAD	0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	48 MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	SMI
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	NL
TOTAL SILVER	<0.01 MG/L	EPA 272.1	NL
TOTAL ZINC	0.34 MG/L	EPA 200.7	SR

Verified: *TR*

PPM - Parts/Million
PPB - Parts/Billion
(- Less than

MG/L - Milligrams/Liter
uG/L - Micrograms/Liter
) - Greater than

MG/KG - Milligrams/Kilogram
uG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Metro East Area, H Gass Farm shallow well
Date Sample Collected: 5-21-87
Date Sample Received: 5-21-87

ANALYTICAL RESULTS

UHL Lab No. 8755462

<u>ANALYTE</u>	<u>CONCENTRATION (ug/L)</u>	<u>QUANTITATION LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	6	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	7	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	7	1
BENZENE	<1	1
BROMOFORM	2	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: *[Signature]*
Date Reported: 6-11-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8755463

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 05/21/87

Date of Report: 05/08/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
 Date Collected: 05/21/87 11:00:00

Sample Description: WATER, DEEP WELL
 Client Reference:

Comments

MARK SAMPSON RESIDENCE, S_DT, S_ST, ALK_T, NA, HAR_T, NOX_N, CL,
 PH, NH3, CO2, SO4, CA, K, FE, AS, BA, CD, CR, COND, CU, PB, HG, NI, SE, ETC.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	10 DEGREES C		
PH VALUE (LAB)	7.3 PH UNITS	EPA 150.1	SMH
SPEC. CONDUCTANCE	2000 uMHOS @ 25 C	EPA 120.1	SMH
TOTAL ALKALINITY	390 MG/L AS CaCO3	EPA 310.1	SMH
TOTAL HARDNESS	463 MG/L AS CaCO3	EPA 130.2	DC
DISSOLVED SOLIDS	1360 MG/L @180 C	EPA 140.1	JGT
SUSPENDED SOLIDS	54 MG/L @103 C	EPA 160.2	JGT
CALCIUM	160 MG/L	EPA 215.2	SR
POTASSIUM	10 MG/L	EPA 250.1	NL
SODIUM	180 MG/L	EPA 200.7	SR
CHLORIDE	12 MG/L	EPA 325.3	SMH
FLUORIDE	1.4 MG/L	USGS 14327	RWW
SULFATE	750 MG/L	EPA 275.4	SMH
AMMONIA (AS N)	7.4 MG/L	EPA 350.1	RLP
NO2+NO3 AS NO3-N	<0.1 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMD	7 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 204.2	NL
TOTAL BARIUM	<0.05 MG/L	EPA 200.7	SR
TOTAL CADMIUM	0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 210.2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MC/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

Date of Report
06/08/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY
Analytical Report for Sample Number 8755463

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	0.03 MG/L	EPA 120.1	HL
TOTAL IRON	20 MG/L	EPA 200.7	SR
TOTAL LEAD	0.05 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	64 MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.12 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	SMH
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	HL
TOTAL SILVER	<0.01 MG/L	EPA 272.1	HL
TOTAL ZINC	0.0 MG/L	EPA 200.7	SR

Verified: 

PPM - Parts/Million
PPB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Metro East Area, M Sampson deep well
Date Sample Collected: 5-21-87
Date Sample Received: 5-21-87

ANALYTICAL RESULTS

UHL Lab No. 8255463

ANALYTE	CONCENTRATION (ug/L)	QUANTITATION LIMIT (ug/L)
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkin
Verified: *[Signature]*
Date Reported: 6-11-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 0755444

Iowa City Laboratory
Oakdale Hall
Iowa City, IA 52242
(319) 335-4500

Des Moines Branch
900 East Grand
H.A. Wallace Building
Des Moines, IA 50319
(515) 281-5371

Date Received: 05/21/87

Date of Report: 06/08/87

Submitter: EPD 5
Address: WALLACE BLDG
City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
Date Collected: 05/21/87 11:00:00

Sample Description: WATER, DEEP WELL
Client Reference:

Comments

MARK SAMPSON (DUPLICATE) S_DT, S_ST, ALK_T, NA, HAR_T, NOX_N, CL,
COND, CU, PB, HG, PH, NH3, COD, SO4, CA, K, FE, AS, BA, CD, CR, ETC.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	10 DEGREES C		
PH VALUE (LAB)	7.3 PH UNITS	EPA 150.1	SMH
SPEC. CONDUCTANCE	2000 uMHOM @ 25 C	EPA 120.1	SMH
TOTAL ALKALINITY	395 MG/L AS CaCO3	EPA 310.1	SMH
TOTAL HARDNESS	467 MG/L AS CaCO3	EPA 130.2	DC
DISSOLVED SOLIDS	1350 MG/L @100 C	EPA 160.1	JGT
SUSPENDED SOLIDS	45 MG/L @100 C	EPA 160.2	JGT
CALCIUM	160 MG/L	EPA 215.2	SR
POTASSIUM	10 MG/L	EPA 250.1	HL
SODIUM	170 MG/L	EPA 200.7	SR
CHLORIDE	12 MG/L	EPA 325.3	SMH
FLUORIDE	1.4 MG/L	USGS 14327	RWV
SULFATE	760 MG/L	EPA 275.4	SMH
AMMONIA (AS N)	7.4 MG/L	EPA 350.1	RLP
NO2+NO3 AS NO3-N	<0.1 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMD	10 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	HL
TOTAL BARIUM	<0.05 MG/L	EPA 200.7	SR
TOTAL CADMIUM	0.002 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

Date of Report
06/08/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8753464

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	0.03 MG/L	EPA 220.1	HL
TOTAL IRON	21 MG/L	EPA 200.7	SR
TOTAL LEAD	0.04 MG/L	EPA 200.7	DC
TOTAL MAGNESIUM	45 MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.13 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	SMM
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	HL
TOTAL SILVER	<0.01 MG/L	EPA 272.1	HL
TOTAL ZINC	8.4 MG/L	EPA 200.7	SR

Verified: *JH*

PPM - Parts/Million
PPB - Parts/Billion
(- Less than

MG/L - Milligrams/Liter
µG/L - Micrograms/Liter
) - Greater than

MG/KG - Milligrams/Kilogram
µG/KG - Micrograms/Kilogram
pCi/l. - pice Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Metro East Area, M Sampson deep well
Date Sample Collected: 5-21-87
Date Sample Received: 5-21-87

ANALYTICAL RESULTS

UHL Lab No. 8755464

<u>ANALYTE</u>	<u>CONCENTRATION (ug/L)</u>	<u>QUANTITATION LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkin
Verified: *[Signature]*
Date Reported: 6-11-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8755465

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (319) 281-3371

Date Received: 05/21/87

Date of Report: 06/08/87

Submitter: EYD S
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUMKELLS
 Date Collected: 05/21/87 01:45:00

Sample Description: WATER, DEEP WELL
 Client Reference:

Comments

WAYNE MILLER RESIDENCE. S_DT, S_ST, ALK_T, NA, HAR_T, NOX_N, CL,
 COND, CU, PR, NH3, COD, SO4, CA, K, FE, AS, BA, CD, CR, PB, HG, NI, SE, ETC.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	10 DEGREES C		
pH VALUE (LAB)	8.0 pH UNITS	EPA 150.1	SMH
SPEC. CONDUCTANCE	3500 SMHOS @ 25 C	EPA 120.1	SMH
TOTAL ALKALINITY	311 MG/L AS CaCO3	EPA 310.1	SMH
TOTAL HARDNESS	215 MG/L AS CaCO3	EPA 130.2	DC
DISSOLVED SOLIDS	2180 MG/L @100 C	EPA 160.1	JCT
SUSPENDED SOLIDS	33 MG/L @100 C	EPA 160.2	JCT
CALCIUM	53 MG/L	EPA 215.2	SR
POTASSIUM	0.3 MG/L	EPA 250.1	HL
SODIUM	660 MG/L	EPA 200.7	SR
CHLORIDE	64 MG/L	EPA 325.3	SMH
FLUORIDE	2.6 MG/L	UBCS 14327	RWV
SULFATE	1300 MG/L	EPA 275.4	SMH
AMMONIA (AS N)	1.3 MG/L	EPA 350.1	RLP
NO2+NO3 AS NO3-N	0.2 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMD	4 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 204.2	ML
TOTAL BARIUM	<0.05 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 215.2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPS - Parts/Billion UG/L - Micrograms/Liter UG/KG - Micrograms/Kilogram
 (- Less than) - Greater than PCl/L - pie Curlew/Liter

Date of Report
06/08/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Page No.
62

Analytical Report for Sample Number 8755443

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	0.22 MG/L	EPA 200.7	SR
TOTAL IRON	14 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	20 MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.05 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	SNM
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01 MG/L	EPA 272.1	ML
TOTAL ZINC	0.76 MG/L	EPA 200.7	SR

Verified: 

PPM - Parts/Million
PPM - Parts/Million
(- Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
) - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Metro East Area, W Miller deep well
Date Sample Collected: 5-21-87
Date Sample Received: 5-21-87

ANALYTICAL RESULTS

UHL Lab No. 8255465

<u>ANALYTE</u>	<u>CONCENTRATION</u> <u>(ug/L)</u>	<u>QUANTITATION</u> <u>LIMIT (ug/L)</u>
<u>VINYL CHLORIDE</u>	<u><1</u>	<u>1</u>
<u>1,1-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CIS- & TRANS-1,2-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CHLOROFORM</u>	<u><1</u>	<u>1</u>
<u>1,1,1-TRICHLOROETHANE</u>	<u><1</u>	<u>1</u>
<u>CARBON TETRACHLORIDE</u>	<u><1</u>	<u>1</u>
<u>BROMODICHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>TRICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>DIBROMOCHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>BENZENE</u>	<u><1</u>	<u>1</u>
<u>BROMOFORM</u>	<u><1</u>	<u>1</u>
<u>1,4-DICHLOROBENZENE</u>	<u><1</u>	<u>1</u>

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkin
Verified: 
Date Reported: 6-11-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8755464

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 05/21/87

Date of Report: 06/08/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUMNELLS
 Date Collected: 05/21/87 01:45:00

Sample Description: WATER, SHALLOW WELL
 Client Reference:

Comments

WAYNE MILLER RESIDENCE. S_DT, S_ST, ALK_T, NA, HAR_T, NOX_N, CL,
 PH, NH3, COD, SO4, CA, K, FE, AS, BA, CD, CR, COND, CU, PB, HG, NI, SR, ETC.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	10 DEGREES C		
pH VALUE (LAB)	7.4 pH UNITS	EPA 150.1	SMM
SPEC. CONDUCTANCE	890 uMHOS @ 25 C	EPA 120.1	SMM
TOTAL ALKALINITY	291 MG/L AS CaCO3	EPA 310.1	SMM
TOTAL HARDNESS	404 MG/L AS CaCO3	EPA 130.2	DC
DISSOLVED SOLIDS	510 MG/L @100 C	EPA 160.1	JGT
SUSPENDED SOLIDS	8 MG/L @100 C	EPA 160.2	JGT
CALCIUM	100 MG/L	EPA 215.2	SR
POTASSIUM	0.3 MG/L	EPA 250.1	HL
SODIUM	0.2 MG/L	EPA 200.7	SR
CHLORIDE	14 MG/L	EPA 325.3	SMM
FLUORIDE	0.65 MG/L	USGS 14327	RW
SULFATE	63 MG/L	EPA 275.4	SMM
AMMONIA (AS N)	<0.1 MG/L	EPA 350.1	RLP
NO2+NO3 AS NO3-N	17 MG/L	EPA 353.2	JAC
CHEMICAL OXYGEN DEMD	4 MG/L	EPA 410.1	JAC
TOTAL ARSENIC	<0.01 MG/L	EPA 204.2	HL
TOTAL BARIUM	0.12 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 216.2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPM - Parts/Million uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

Date of Report
04/08/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8755466

Page No.
02

TEST	CONCENTRATION		METHOD USED	ANALYST
-----	-----	-----	-----	-----
TOTAL COPPER	0.02	MG/L	220.1	NL
TOTAL IRON	0.12	MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01	MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	38	MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02	MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001	MG/L	EPA 245.1	SMD
TOTAL NICKEL	<0.05	MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01	MG/L	EPA 270.2	NL
TOTAL SILVER	<0.01	MG/L	EPA 273.1	NL
TOTAL ZINC	0.07	MG/L	EPA 200.7	SR

Verified: *LR*

PPM - Parts/Million
PPB - Parts/Billion
(- Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
) - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pica Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: W. Miller - Shallow Well
Date Sample Collected: 5-21-87
Date Sample Received: 5-21-87

ANALYTICAL RESULTS

UHL Lab No. 8755466

<u>ANALYTE</u>	<u>CONCENTRATION (ug/L)</u>	<u>QUANTITATION LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkin
Verified: *[Signature]*
Date Reported: 6-11-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8755467

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 N.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-3371

Date Received: 05/21/87

Date of Report: 06/08/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUMKELLS
 Date Collected: 05/21/87 01:45:00

Sample Description: WATER, SHALLOW WELL
 Client Reference:

Comments

DOM MILLER RESIDENCE, S_DT, S_ST, ALK_T, NA, HAR_T, NOX_N, CL, COND,
 PH, NH3, COB, SO4, CA, K, FE, AS, BA, CD, CR, CU, PB, HG, NI, SE, AG, MN, ETC.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	10 DEGREES C		
PH VALUE (LAB)	7.0 PH UNITS	EPA 150.1	SMH
SPEC. CONDUCTANCE	1100 uMHOS @ 25 C	EPA 120.1	SMH
TOTAL ALKALINITY	210 MG/L AS CaCO3	EPA 310.1	SMH
TOTAL HARDNESS	464 MG/L AS CaCO3	EPA 130.2	DC
DISSOLVED SOLIDS	650 MG/L @100 C	EPA 160.1	JGT
SUSPENDED SOLIDS	<1 MG/L @100 C	EPA 160.2	JGT
CALCIUM	110 MG/L	EPA 215.2	SR
POTASSIUM	0.2 MG/L	EPA 250.1	NL
SODIUM	13 MG/L	EPA 200.7	SR
CHLORIDE	50 MG/L	EPA 325.3	SMH
FLUORIDE	0.4 MG/L	USEGS 14327	RUV
SULFATE	77 MG/L	EPA 275.4	SMH
AMMONIA (AS N)	<0.1 MG/L	EPA 350.1	RLP
NO2+NO3 AS NO3-N	40 MG/L	EPA 333.2	JAG
CHEMICAL OXYGEN DEMD	<1 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	NL
TOTAL BARIUM	0.07 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 210.2	DC

PPM - Parts/Million MG/L - Milligram/Liter MG/KG - Milligrams/Kilogram
 PPH - Parts/Billion uG/L - Microgram/Liter uG/KG - Microgram/Kilogram
 < - Less than > - Greater than pCi/L - pic Curies/Liter

Date of Report
06/08/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8755467

Page No.
02

TEST	CONCENTRATION		METHOD USED	ANALYST
TOTAL COPPER	0.02	MG/L	EPA 230.1	NL
TOTAL IRON	0.05	MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01	MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	46	MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02	MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001	MG/L	EPA 245.1	SMI
TOTAL NICKEL	<0.05	MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01	MG/L	EPA 270.2	NL
TOTAL SILVER	<0.01	MG/L	EPA 272.1	NL
TOTAL ZINC	<0.02	MG/L	EPA 200.7	SR

Verified: 

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
(- Less than) - Greater than pCi/L - pice Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Don Miller
Date Sample Collected: 5-21-87
Date Sample Received: 5-21-87

ANALYTICAL RESULTS

UHL Lab No. 8755467

<u>ANALYTE</u>	<u>CONCENTRATION</u> <u>(ug/L)</u>	<u>QUANTITATION</u> <u>LIMIT (ug/L)</u>
<u>VINYL CHLORIDE</u>	<u><1</u>	<u>1</u>
<u>1,1-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CIS- & TRANS-1,2-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CHLOROFORM</u>	<u><1</u>	<u>1</u>
<u>1,1,1-TRICHLOROETHANE</u>	<u><1</u>	<u>1</u>
<u>CARBON TETRACHLORIDE</u>	<u><1</u>	<u>1</u>
<u>BROMODICHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>TRICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>DIBROMOCHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>BENZENE</u>	<u><1</u>	<u>1</u>
<u>BROMOFORM</u>	<u><1</u>	<u>1</u>
<u>1,4-DICHLOROBENZENE</u>	<u><1</u>	<u>1</u>

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: *JY*
Date Reported: 6-11-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8755490

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 05/22/87

Date of Report: 06/08/87

Submitter: EFD S
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
 Date Collected: 05/22/87 12:00:00

Sample Description: WATER, SHALLOW WELL
 Client Reference:

Comments

N. JOHNSTON FARM HAND PUMP WELL
 S_ST, S_DT, ALK_T, NA, HAR_T, NOX_M, CL, COND, PH, NH3, COD, SO4, ETC.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
pH VALUE (LAB)	7.5 pH UNITS	EPA 150.1	SMH
SPEC. CONDUCTANCE	940 μ MHOS @ 25 C	EPA 120.1	SMH
TOTAL ALKALINITY	281 MG/L AS CaCO3	EPA 310.1	SMH
TOTAL HARDNESS	370 MG/L AS CaCO3	EPA 130.2	DC
DISSOLVED SOLIDS	570 MG/L @180 C	EPA 140.1	JGT
SUSPENDED SOLIDS	5 MG/L @103 C	EPA 160.2	JGT
CALCIUM	97 MG/L	EPA 215.2	SR
POTASSIUM	0.7 MG/L	EPA 250.1	NL
SODIUM	38 MG/L	EPA 200.7	SR
CHLORIDE	39 MG/L	EPA 325.3	SMH
FLUORIDE	0.5 MG/L	USGS 14327	RWW
SULFATE	71 MG/L	EPA 275.4	SMH
AMMONIA (AS N)	<0.1 MG/L	EPA 350.1	RLP
NO2+NO3 AS NO3-N	20 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMAND	4 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	NL
TOTAL BARIUM	0.17 MG/L	EPA 200.7	SR
TOTAL CADMIUM	0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC
TOTAL COPPER	<0.01 MG/L	EPA 220.1	NL

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPS - Parts/Billion μ G/L - Micrograms/Liter μ G/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pico Curies/Liter

Date of Report
06/08/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8753490

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL IRON	0.39 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	31 MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.02 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	SHM
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	HL
TOTAL SILVER	<0.01 MG/L	EPA 272.1	HL
TOTAL ZINC,	2.9 MG/L	EPA 200.7	SR

Verified: *JH*

PPM - Parts/Million
PPM - Parts/Million
(- Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
) - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Department of Natural Resources F.O. 5
Client Address: 900 E Grand
Des Moines, Iowa 50319

Client Sample Identification: M Johnston Farm - shallow hand pump well
Date Sample Collected: 5/22/87
Date Sample Received: 5/22/87

ANALYTICAL RESULTS

UHL Lab No. 8755490

<u>ANALYTE</u>	<u>CONCENTRATION</u> <u>(ug/L)</u>	<u>QUANTITATION</u> <u>LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: *[Signature]*
Date Reported: 6/15/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8755492

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 05/22/87

Date of Report: 06/08/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
 Date Collected: 05/22/87 12:00:00

Sample Description: WATER, DEEP WELL
 Client Reference:

Comments

N. JOHNSTON FARM
 S_ST, S_DT, ALK_T, MA, HAR_T, NOX_N, CL, COND, PH, NH3, COD, SO4, ETC.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
pH VALUE (LAB)	7.5 pH UNITS	EPA 150.1	SMH
SPEC. CONDUCTANCE	1200 µMHOS @ 25 C	EPA 120.1	SMH
TOTAL ALKALINITY	353 MG/L AS CaCO3	EPA 310.1	SMH
TOTAL HARDNESS	452 MG/L AS CaCO3	EPA 130.2	DC
DISSOLVED SOLIDS	830 MG/L @180 C	EPA 160.1	JGT
SUSPENDED SOLIDS	36 MG/L @103 C	EPA 160.2	JGT
CALCIUM	110 MG/L	EPA 215.2	SR
POTASSIUM	31 MG/L	EPA 250.1	NL
SODIUM	71 MG/L	EPA 200.7	SR
CHLORIDE	24 MG/L	EPA 325.3	SMH
FLUORIDE	0.4 MG/L	USGS 14327	RWV
SULFATE	300 MG/L	EPA 275.4	SMH
AMMONIA (AS N)	0.9 MG/L	EPA 350.1	RLP
NO2+NO3 AS NO3-N	0.4 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMD	12 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	NL
TOTAL BARIUM	<0.05 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 210.2	DC
TOTAL COPPER	<0.01 MG/L	EPA 220.1	NL

PPM - Parts/Million
 PPB - Parts/Billion
 < - Less than

MG/L - Milligrams/Liter
 µG/L - Micrograms/Liter
 > - Greater than

MG/KG - Milligrams/Kilogram
 µG/KG - Micrograms/Kilogram
 pCi/L - pico Curies/Liter

Date of Report
06/06/57

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8733493

Page No.
02

TEST	CONCENTRATION		METHOD USED	ANALYST
-----	-----	-----	-----	-----
TOTAL IRON	2.5	MG/L	EPA 200.7	SR
TOTAL LEAD	0.01	MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	43	MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.14	MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001	MG/L	EPA 245.1	SMH
TOTAL NICKEL	<0.05	MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01	MG/L	EPA 270.2	HL
TOTAL SILVER	<0.01	MG/L	EPA 272.1	HL
TOTAL ZINC	2.0	MG/L	EPA 200.7	SR

Verified: *ZP*

PPM - Parts/Million
PPB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Department of Natural Resources F.O. 5
Client Address: 900 E Grand
Des Moines, Iowa 50319

Client Sample Identification: M. Johnston Farm - deep well
Date Sample Collected: 5/22/87
Date Sample Received: 5/22/87

ANALYTICAL RESULTS

UHL Lab No. 8752492

<u>ANALYTE</u>	<u>CONCENTRATION</u> <u>(ug/L)</u>	<u>QUANTITATION</u> <u>LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: 
Date Reported: 6/15/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8755491

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 W.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 03/22/87

Date of Report: 04/08/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
 Date Collected: 03/22/87 01:00:00

Sample Description: WATER, SHALLOW WELL
 Client Reference:

Comments

N. JOHNSTON FARM FIELD WELL
 S_ST, S_DT, ALK_T, NA, NAR_T, NOX_N, CL, COND, PH, NH3, COD, SO4, ETC.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	UNIT	METHOD USED	ANALYST
pH VALUE (LAB)	7.4	pH UNITS	EPA 150.1	SMH
SPEC. CONDUCTANCE	530	µMOS @ 25 C	EPA 120.1	SMH
TOTAL ALKALINITY	149	MG/L AS CaCO3	EPA 310.1	SMH
TOTAL HARDNESS	239	MG/L AS CaCO3	EPA 130.2	DC
DISSOLVED SOLIDS	310	MG/L @100 C	EPA 160.1	JGT
SUSPENDED SOLIDS	11	MG/L @100 C	EPA 160.2	JGT
CALCIUM	66	MG/L	EPA 213.2	SR
POTASSIUM	0.7	MG/L	EPA 250.1	NL
SODIUM	7.0	MG/L	EPA 200.7	SR
CHLORIDE	23	MG/L	EPA 325.3	SMH
FLUORIDE	0.4	MG/L	USGS 14327	RWV
SULFATE	29	MG/L	EPA 275.4	SMH
AMMONIA (AS N)	<0.1	MG/L	EPA 350.1	RLP
NO2+NO3 AS NO3-N	6.3	MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMD	4	MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01	MG/L	EPA 204.2	NL
TOTAL BARIUM	0.10	MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001	MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01	MG/L	EPA 210.2	DC
TOTAL COPPER	<0.01	MG/L	EPA 220.1	NL

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion µG/L - Micrograms/Liter µG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

Date of Report
06/06/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8755491

Page No.
03

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL IRON	0.10 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	10 MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.02 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	SDM
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	NL
TOTAL SILVER	<0.01 MG/L	EPA 272.1	NL
TOTAL ZINC	<0.02 MG/L	EPA 200.7	SR

Verified: *JK*

PPM - Parts/Million
PPB - Parts/Billion
(- Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
) - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Department of Natural Resources F.O. 5
Client Address: 900 E Grand
Des Moines, Iowa 50319

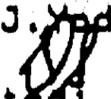
Client Sample Identification: M. Johnston Farm - field well
Date Sample Collected: 5/22/87
Date Sample Received: 5/22/87

ANALYTICAL RESULTS

UHL Lab No. 8755491

<u>ANALYTE</u>	<u>CONCENTRATION (ug/L)</u>	<u>QUANTITATION LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkin
Verified: 
Date Reported: 6/15/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 0753493

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 03/22/67

Date of Report: 04/08/67

Submitter: EPD S
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
 Date Collected: 05/22/67 10:15:00

Sample Description: WATER, DEEP WELL
 Client Reference:

Comments

C.V. SOUTTER FARM
 S_ST, S_DT, ALK_T, NA, HAR_T, NO3_N, CL, COND, PH, NH3, COD, SO4, ETC.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
pH VALUE (LAB)	7.5 pH UNITS	EPA 150.1	SMH
SPEC. CONDUCTANCE	2100 µMHOS @ 25 C	EPA 120.1	SMH
TOTAL ALKALINITY	456 MG/L AS CaCO3	EPA 310.1	SMH
TOTAL HARDNESS	382 MG/L AS CaCO3	EPA 130.2	DC
DISSOLVED SOLIDS	1350 MG/L @180 C	EPA 160.1	JGT
SUSPENDED SOLIDS	11 MG/L @100 C	EPA 160.2	JGT
CALCIUM	97 MG/L	EPA 215.2	SR
POTASSIUM	8.2 MG/L	EPA 250.1	HL
SODIUM	300 MG/L	EPA 200.7	SR
CHLORIDE	4.5 MG/L	EPA 325.3	SMH
FLUORIDE	1.6 MG/L	USGS 14327	RLV
SULFATE	650 MG/L	EPA 275.4	SMH
AMMONIA (AS N)	2.3 MG/L	EPA 350.1	RLP
NO2+NO3 AS NO3-N	<0.1 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMAND	<1 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 204.2	HL
TOTAL BARIUM	<0.05 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 313.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 210.2	DC
TOTAL COPPER	<0.01 MG/L	EPA 220.1	HL

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPM - Parts/Million µG/L - Micrograms/Liter µG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

Date of Report
06/08/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY
Analytical Report for Sample Number 0755493

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL IRON	2.9 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	34 MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.03 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 243.1	SDM
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.3	NL
TOTAL SILVER	<0.01 MG/L	EPA 272.1	NL
TOTAL ZINC	0.12 MG/L	EPA 200.7	SR

Verified: 

PPM - Parts/Million
PPB - Parts/Billion
(- Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
) - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Department of Natural Resources F.O. 5
Client Address: 900 E Grand
Des Moines, Iowa 50319

Client Sample Identification: C.W. Soutler - deep well
Date Sample Collected: 5/22/87
Date Sample Received: 5/22/87

ANALYTICAL RESULTS

UHL Lab No. 8755493

<u>ANALYTE</u>	<u>CONCENTRATION</u> <u>(ug/L)</u>	<u>QUANTITATION</u> <u>LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: *[Signature]*
Date Reported: 6/15/87

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Shipping Blank
Date Sample Collected: 5-20-87
Date Sample Received: 5-20-87

ANALYTICAL RESULTS

UHL Lab No. 8704652

ANALYTE	CONCENTRATION (ug/L)	QUANTITATION LIMIT (ug/L)
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: *[Signature]*
Date Reported: 6-11-87

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Shipping Blank
Date Sample Collected: 5-21-87
Date Sample Received: 5-21-87

ANALYTICAL RESULTS

UHL Lab No. 8704659

<u>ANALYTE</u>	<u>CONCENTRATION (ug/L)</u>	<u>QUANTITATION LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: *[Signature]*
Date Reported: 6-11-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8756592

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 06/17/87

Date of Report: 07/08/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
 Date Collected: 06/16/87 10:20:00

Sample Description: WATER, WELL SHALLOW
 Client Reference:

Comments

NEAR METRO EAST SLF FRES DEGROOT RES, PRIVATE
 DES MOINES METRO LANDFILL STUDY, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	14 DEGREES C		
pH VALUE (LAB)	7.6 pH UNITS	EPA 150.1	SMM
SPEC. CONDUCTANCE	1400 uMHOS @ 25 C	EPA 120.1	DC
TOTAL ALKALINITY	340 MG/L AS CaCO3	EPA 310.1	SMM
TOTAL HARDNESS	684 MG/L AS CaCO3	EPA 130.2	SMM
DISSOLVED SOLIDS	670 MG/L @180 C	EPA 160.1	JGT
SUSPENDED SOLIDS	<1 MG/L @103 C	EPA 160.2	JGT
POTASSIUM	<0.1 MG/L	EPA 250.1	ML
SODIUM	19 MG/L	EPA 200.7	SR
CHLORIDE	38 MG/L	EPA 325.3	DC
FLUORIDE	0.25 MG/L	USCS 14327	RWW
SULFATE	130 MG/L	EPA 275.4	SMM
AMMONIA (AS N)	<0.01 MG/L	EPA 350.1	RLP
NO2+NO3 AS NO3-N	56 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMD	8 MG/L	EPA 310.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 204.2	DC
TOTAL BARIUM	0.13 MG/L	EPA 280.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CALCIUM	170 MG/L	EPA 200.7	SR
TOTAL CHROMIUM	<0.01 MG/L	EPA 210.2	DC

PPM - Parts/Million
 PPM - Parts/Billion
 < - Less than

MG/L - Milligrams/Liter
 uG/L - Micrograms/Liter
 > - Greater than

MG/KG - Milligrams/Kilogram
 uG/KG - Micrograms/Kilogram
 pCi/L - pico Curies/Liter

Date of Report
07/08/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8756592

Page No.
02

TEST	CONCENTRATION		METHOD USED	ANALYST
-----	-----	-----	-----	-----
TOTAL COPPER	<0.01	MG/L	EPA 229.1	DC
IRON	<0.02	MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01	MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	63	MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02	MG/L	EPA 280.7	SR
TOTAL MERCURY	<0.001	MG/L	EPA 245.1	HL
TOTAL SELENIUM	<0.01	MG/L	EPA 270.2	DC
TOTAL SILVER	<0.01	MG/L	EPA 272.1	DC
TOTAL ZINC	0.15	MG/L	EPA 200.7	SR

Verified:

TF

PPM - Parts/Million
PPB - Parts/Billion
(- Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
) - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Fred DeGroot Residence - Shallow Well
Date Sample Collected: 6-16-87
Date Sample Received: 6-17-87

ANALYTICAL RESULTS

UHL Lab No. 8756592

ANALYTE	CONCENTRATION (ug/L)	QUANTITATION LIMIT (ug/L)
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: *[Signature]*
Date Reported: 6-29-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8756591

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 W.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 06/17/87

Date of Report: 07/08/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
 Date Collected: 06/16/87 10:45:00

Sample Description: WATER, WELL DEEP
 Client Reference:

Comments

NEAR METRO EAST SLP VOGELAAR RES, WELL 148' DEEP
 DES MOINES METRO LANDFILL STUDY, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	12 DEGREES C		
pH VALUE (LAB)	8.0 pH UNITS	EPA 150.1	SMH
SPEC. CONDUCTANCE	1300 uMHOS @ 25 C	EPA 120.1	DC
TOTAL ALKALINITY	521 MG/L AS CaCO3	EPA 310.1	SMH
TOTAL HARDNESS	572 MG/L AS CaCO3	EPA 130.2	SMH
DISSOLVED SOLIDS	840 MG/L @180 C	EPA 160.1	JGT
SUSPENDED SOLIDS	<1 MG/L @103 C	EPA 160.2	JGT
POTASSIUM	5.8 MG/L	EPA 250.1	ML
SODIUM	50 MG/L	EPA 200.7	SR
CHLORIDE	5.0 MG/L	EPA 325.3	DC
FLUORIDE	0.25 MG/L	USGS 14327	RVW
SULFATE	190 MG/L	EPA 275.4	SMH
AMMONIA (AS-N)	6.7 MG/L	EPA 350.1	RLP
NO2+NO3 AS NO3-N	2.3 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMD	12 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 204.2	DC
TOTAL BARIUM	<0.05 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CALCIUM	140 MG/L	EPA 200.7	SR
TOTAL CHROMIUM	<0.01 MG/L	EPA 210.2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

Date of Report
07/08/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 0754391

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	<0.00 MG/L	EPA 220.1	DC
IRON	0.22 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	54 MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	HL
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	DC
TOTAL SILVER	<0.01 MG/L	EPA 272.1	DC
TOTAL ZINC	0.01 MG/L	EPA 200.7	SR

Verified: 

PPM - Parts/Million
PPB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Vogelaar Residence - Deep Well
Date Sample Collected: 6-16-87
Date Sample Received: 6-17-87

ANALYTICAL RESULTS

UHL Lab No. 8756591

<u>ANALYTE</u>	<u>CONCENTRATION</u> <u>(ug/L)</u>	<u>QUANTITATION</u> <u>LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: *[Signature]*
Date Reported: 6-29-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report (Tr Sample Number 8754590

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 06/17/87

Date of Report: 07/08/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
 Date Collected: 06/16/87 11:00:00

Sample Description: WATER, WELL SHALLOW
 Client Reference:

Comments

NEAR METRO EAST SLF BURDOCK RES.
 DES MOINES METRO LANDFILL STUDY, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	10 DEGREES C		
pH VALUE (LAB)	7.5 pH UNITS	EPA 150.1	SMH
SPEC. CONDUCTANCE	2400 uMHOS @ 25 C	EPA 120.1	DC
TOTAL ALKALINITY	304 MG/L AS CaCO3	EPA 310.1	SMH
TOTAL HARDNESS	1190 MG/L AS CaCO3	EPA 130.2	SMH
DISSOLVED SOLIDS	1700 MG/L @100 C	EPA 160.1	JGT
SUSPENDED SOLIDS	<1 MG/L @103 C	EPA 160.2	JGT
POTASSIUM	0.3 MG/L	EPA 253.1	HL
SODIUM	22 MG/L	EPA 200.7	SR
CHLORIDE	160 MG/L	EPA 325.3	DC
FLUORIDE	0.3 MG/L	USCS 14327	RWW
SULFATE	260 MG/L	EPA 275.4	SMH
AMMONIA (AS N)	<0.01 MG/L	EPA 350.1	RLP
NO2+NO3 AS NO3-N	120 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMD	20 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	DC
TOTAL BARIUM	0.09 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CALCIUM	280 MG/L	EPA 200.7	SR
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

Date of Report
07/08/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Page No.
03

Analytical Report for Sample Number 8756590

TEST	CONCENTRATION	METHOD USED	ANALYSIS
TOTAL COPPER	<0.01 MG/L	EPA 229.1	DC
IRON	0.42 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	120 MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	HL
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	DC
TOTAL SILVER	<0.01 MG/L	EPA 272.1	DC
TOTAL ZINC	0.38 MG/L	EPA 200.7	SR

Verified: *JP*

PPM - Parts/Million
PPB - Parts/Billion
(- Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
) - Greater than

MG/KG - Milligram/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Burdock - Shallow
Date Sample Collected: 6-16-87
Date Sample Received: 6-17-87

ANALYTICAL RESULTS

UHL Lab No. 8256590

<u>ANALYTE</u>	<u>CONCENTRATION</u> <u>(ug/L)</u>	<u>QUANTITATION</u> <u>LIMIT (ug/L)</u>
<u>VINYL CHLORIDE</u>	<u><1</u>	<u>1</u>
<u>1,1-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CIS- & TRANS-1,2-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CHLOROFORM</u>	<u><1</u>	<u>1</u>
<u>1,1,1-TRICHLOROETHANE</u>	<u><1</u>	<u>1</u>
<u>CARBON TETRACHLORIDE</u>	<u><1</u>	<u>1</u>
<u>BROMODICHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>TRICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>DIBROMOCHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>BENZENE</u>	<u><1</u>	<u>1</u>
<u>BROMOFORM</u>	<u><1</u>	<u>1</u>
<u>1,4-DICHLOROBENZENE</u>	<u><1</u>	<u>1</u>

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: *[Signature]*
Date Reported: 6-29-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8754589

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 06/17/87

Date of Report: 07/08/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
 Date Collected: 06/16/87 11:00:00

Sample Description: WATER, WELL DEEP
 Client Reference:

Comments

NEAR METRO EAST SLF BURDOCK RES.
 DES MOINES METRO LANDFILL STUDY, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	11 DEGREES C		
pH VALUE (LAB)	8.1 pH UNITS	EPA 150.1	SHM
SPEC. CONDUCTANCE	1600 uMHOS @ 25 C	EPA 120.1	DC
TOTAL ALKALINITY	541 MG/L AS CaCO3	EPA 310.1	SHM
TOTAL HARDNESS	486 MG/L AS CaCO3	EPA 130.2	SHM
DISSOLVED SOLIDS	1010 MG/L @180 C	EPA 140.1	JGT
SUSPENDED SOLIDS	10 MG/L @103 C	EPA 140.2	JGT
POTASSIUM	9.6 MG/L	EPA 250.1	HL
SODIUM	120 MG/L	EPA 200.7	SR
CHLORIDE	1.5 MG/L	EPA 325.3	DC
FLUORIDE	0.45 MG/L	USGS 14327	RWW
SULFATE	140 MG/L	EPA 275.4	SHM
AMMONIA (AS-N)	8.7 MG/L	EPA 350.1	NLP
NO2-NO3 AS NO3-N	<0.1 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMD	11 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	DC
TOTAL BARIUM	<0.05 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CALCIUM	130 MG/L	EPA 200.7	SR
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPS - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

Date of Report
07/08/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8754589

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	<0.01 MG/L	EPA 220.1	DC
IRON	3.7 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	66 MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.04 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	AL
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	DC
TOTAL SILVER	<0.01 MG/L	EPA 272.1	DC
TOTAL ZINC	0.05 MG/L	EPA 200.7	SR

Verified: *JF*

PPM - Parts/Million
PPB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
µG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
µG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Burdock Res. - Deep Well
Date Sample Collected: 6-16-87
Date Sample Received: 6-17-87

ANALYTICAL RESULTS

UHL Lab No. 8256589

<u>ANALYTE</u>	<u>CONCENTRATION</u> <u>(ug/L)</u>	<u>QUANTITATION</u> <u>LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: *[Signature]*
Date Reported: 6-29-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report For Sample Number 8756557

Iowa City Laboratory
Oakdale Hall
Iowa City, IA 52242
(319) 335-4500

Des Moines Branch
900 East Grand
H.A. Wallace Building
Des Moines, IA 50319
(515) 281-5371

Date Received: 06/17/87

Date of Report: 07/08/87

Submitter: EPD 5
Address: WALLACE BLDG
City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
Date Collected: 06/16/87 01:20:00

Sample Description: WATER, WELL SHALLOW
Client Reference:

Comments

NEAR METRO EAST SLP HIBBS RES.
DES MOINES METRO LANDFILL STUDY, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	12 DEGREES C		
pH VALUE (LAB)	7.8 pH UNITS	EPA 150.1	SMH
SPEC. CONDUCTANCE	760 uMHOS @ 25 C	EPA 120.1	DC
TOTAL ALKALINITY	346 MG/L AS CaCO3	EPA 310.1	SMH
TOTAL HARDNESS	375 MG/L AS CaCO3	EPA 130.2	SMH
DISSOLVED SOLIDS	440 MG/L @ 180 C	EPA 140.1	JGT
SUSPENDED SOLIDS	3 MG/L @ 103 C	EPA 140.2	JGT
POTASSIUM	<0.1 MG/L	EPA 250.1	ML
SODIUM	7.9 MG/L	EPA 200.7	SR
CHLORIDE	12 MG/L	EPA 325.3	DC
FLUORIDE	0.35 MG/L	USGS 14327	RWV
SULFATE	36 MG/L	EPA 275.4	SMH
AMMONIA (AS N)	<0.01 MG/L	EPA 350.1	RFP
NO2+NO3 AS NO3-N	<0.1 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMAND	0 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	DC
TOTAL BARIUM	0.17 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CALCIUM	93 MG/L	EPA 200.7	SR
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC

PPM - Parts/Million
PPB - Parts/Billion
(- Less than

MG/L - Milligrams/Liter
uG/L - Micrograms/Liter
) - Greater than

MG/KG - Milligrams/Kilogram
uG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

Date of Report
17/08/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 0756587

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	<0.01 MG/L	EPA 230.1	DC
IRON	1.4 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	34 MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.33 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	NL
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	DC
TOTAL SILVER	<0.01 MG/L	EPA 272.1	DC
TOTAL ZINC	2.2 MG/L	EPA 200.7	SR

Verified: *JTF*

PPM - Parts/Million
PPB - Parts/Billion
(- Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
) - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pice Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Hibbs Residence - Shallow Well
Date Sample Collected: 6-16-87
Date Sample Received: 6-17-87

ANALYTICAL RESULTS

UHL Lab No. 8756587

<u>ANALYTE</u>	<u>CONCENTRATION</u> <u>(ug/L)</u>	<u>QUANTITATION</u> <u>LIMIT (ug/L)</u>
<u>VINYL CHLORIDE</u>	<u><1</u>	<u>1</u>
<u>1,1-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CIS- & TRANS-1,2-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CHLOROFORM</u>	<u><1</u>	<u>1</u>
<u>1,1,1-TRICHLOROETHANE</u>	<u><1</u>	<u>1</u>
<u>CARBON TETRACHLORIDE</u>	<u><1</u>	<u>1</u>
<u>BROMODICHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>TRICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>DIBROMOCHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>BENZENE</u>	<u><1</u>	<u>1</u>
<u>BROMOFORM</u>	<u><1</u>	<u>1</u>
<u>1,4-DICHLOROBENZENE</u>	<u><1</u>	<u>1</u>

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: 
Date Reported: 6-29-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8754585

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 333-4500

Des Moines Branch
 900 East Grand
 W.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-3371

Date Received: 06/17/87

Date of Report: 07/08/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUNNELLS
 Date Collected: 06/16/87 01:30:00

Sample Description: WATER, WELL DEEP
 Client Reference: -

Comments

NEAR METRO EAST BLF DANKS RES.
 DES MOINES METRO LANDFILL STUDY, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	13 DEGREES C		
pH VALUE (LAB)	7.5 pH UNITS	EPA 150.1	SMH
SPEC. CONDUCTANCE	4100 UMHOS @ 25 C	EPA 120.1	DC
TOTAL ALKALINITY	265 MG/L AS CaCO3	EPA 310.1	SMH
TOTAL HARDNESS	1320 MG/L AS CaCO3	EPA 130.2	SMH
DISSOLVED SOLIDS	3200 MG/L @180 C	EPA 140.1	JGT
SUSPENDED SOLIDS	23 MG/L @103 C	EPA 140.2	JGT
POTASSIUM	12 MG/L	EPA 258.1	ML
SODIUM	890 MG/L	EPA 200.7	SR
CHLORIDE	50 MG/L	EPA 325.3	DC
FLUORIDE	2.2 MG/L	USGS 14327	RWJ
SULFATE	2200 MG/L	EPA 275.4	SMH
AMMONIA (AS-N)	2.2 MG/L	EPA 350.1	RLP
NO2+NO3 AS NO3-N	<0.1 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMD	8 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	DC
TOTAL BARIUM	<0.05 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 215.2	DC
TOTAL CALCIUM	340 MG/L	EPA 200.7	SR
TOTAL CHROMIUM	0.01 MG/L	EPA 218.2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion µG/L - Micrograms/Liter µG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

Date of Report
07/06/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 0756585

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	<0.01 MG/L	EPA 220.1	DC
IRON	12 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	110 MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.1 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	ML
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	DC
TOTAL SILVER	<0.01 MG/L	EPA 272.1	DC
TOTAL ZINC	0.04 MG/L	EPA 200.7	SR

Verified: 

PPM - Parts/Million
PPB - Parts/Billion
(- Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
) - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Danks Res. - Deep Well
Date Sample Collected: 6-16-87
Date Sample Received: 6-17-87

ANALYTICAL RESULTS

UHL Lab No. 8756585

<u>ANALYTE</u>	<u>CONCENTRATION</u> <u>(ug/L)</u>	<u>QUANTITATION</u> <u>LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Fitkins
Verified: *[Signature]*
Date Reported: 6-29-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number: 8756586

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 M.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-9371

Date Received: 66/17/87

Date of Report: 07/08/87

Submitter: EPD 3
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUMNELLS
 Date Collected: 66/16/87 01:30:00

Sample Description: WATER, WELL SHALLOW
 Client Reference:

Comments

NEAR METRO EAST SLY DAMKS RES.
 DES MOINES METRO LANDFILL STUDY, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
-----	-----	-----	-----
TEMPERATURE	11 DEGREES C		
pH VALUE (LAB)	7.65 pH UNITS	EPA 150.1	SMH
SP/C. CONDUCTANCE	1200 uMHOS @ 25 C	EPA 120.1	DC
TOTAL ALKALINITY	333 MG/L AS CaCO3	EPA 310.1	SMH
TOTAL HARDNESS	605 MG/L AS CaCO3	EPA 130.2	SMH
DISSOLVED SOLIDS	790 MG/L @100 C	EPA 160.1	JGT
SUSPENDED SOLIDS	<1 MG/L @100 C	EPA 160.2	JGT
POTASSIUM	1.0 MG/L	EPA 250.1	NL
SODIUM	21 MG/L	EPA 200.7	SR
CHLORIDE	64 MG/L	EPA 325.3	DC
FLUORIDE	0.3 MG/L	USGS 14337	RWV
SULFATE	140 MG/L	EPA 275.4	SMH
AMMONIA (AS N)	<0.01 MG/L	EPA 350.1	RLP
NO2+NO3 AS NO3-N	15 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMD	24 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	DC
TOTAL BARIUM	0.07 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CALCIUM	140 MG/L	EPA 200.7	SR
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPM - Parts/Million uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 < - Less than) - Greater than pCi/L - pico Curies/Liter

Date of Report
07/08/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8736586

Page No.
02

TEST	CONCENTRATION		METHOD USED	ANALYST
-----	-----	-----	-----	-----
TOTAL COPPER	<0.01	MG/L	EPA 220.1	DC
IRON	0.11	MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01	MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	42	MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02	MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001	MG/L	EPA 245.1	ML
TOTAL SELENIUM	<0.01	MG/L	EPA 270.2	DC
TOTAL SILVER	<0.01	MG/L	EPA 272.1	DC
TOTAL ZINC	0.04	MG/L	EPA 200.7	SR

Verified: *JFF*

PPM - Parts/Million
PPB - Parts/Billion
(< - Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
) - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Danks Res. - Shallow Lot
Date Sample Collected: 6-16-87
Date Sample Received: 6-17-87

ANALYTICAL RESULTS

UHL Lab No. 8756586

<u>ANALYTE</u>	<u>CONCENTRATION</u> <u>(ug/L)</u>	<u>QUANTITATION</u> <u>LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: *[Signature]*
Date Reported: 6-29-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8754584

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H. A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 06/17/87

Date of Report: 07/08/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUNNELLS
 Date Collected: 06/16/87 01:30:00

Sample Description: WATER, WELL SHALLOW
 Client Reference:

Comments

NEAR METRO EAST SLP DANKS RES, PASTURE SHALLOW WELL
 DES MOINES METRO LANDFILL STUDY, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	11 DEGREES C		
pH VALUE (LAB)	7.83 pH UNITS	EPA 150.1	SMH
SPEC. CONDUCTANCE	430 uMHOS @ 25 C	EPA 120.1	DC
TOTAL ALKALINITY	178 MG/L AS CaCO3	EPA 310.1	SMH
TOTAL HARDNESS	192 MG/L AS CaCO3	EPA 130.2	SMH
DISSOLVED SOLIDS	240 MG/L @180 C	EPA 140.1	JGT
SUSPENDED SOLIDS	<1 MG/L @103 C	EPA 140.2	JGT
POTASSIUM	1.0 MG/L	EPA 250.1	HL
SODIUM	8.8 MG/L	EPA 200.7	SR
CHLORIDE	1.0 MG/L	EPA 325.3	DC
FLUORIDE	0.35 MG/L	USGS 14327	RWV
SULFATE	28 MG/L	EPA 275.4	SMH
AMMONIA (AS N)	0.87 MG/L	EPA 350.1	RLP
NO2+NO3 AS NO3-N	0.2 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMD	4 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	DC
TOTAL BARIUM	0.06 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CALCIUM	52 MG/L	EPA 200.7	SR
TOTAL CHROMIUM	<0.01 MG/L	EPA 210.2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

Date of Report
07/28/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8754584

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	<0.01 MG/L	EPA 220.1	DC
IRON	0.22 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	15 MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.24 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	ML
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	DC
TOTAL SILVER	<0.01 MG/L	EPA 272.1	DC
TOTAL ZINC	0.63 MG/L	EPA 200.7	SR

Verified: *JA*

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
PPM - Parts/Billion µG/L - Micrograms/Liter µG/KG - Micrograms/Kilogram
(- Less than) - Greater than pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Danks Res. - Shallow Pasture
Date Sample Collected: 6-16-87
Date Sample Received: 6-17-87

ANALYTICAL RESULTS

UHL Lab No. 8256584

<u>ANALYTE</u>	<u>CONCENTRATION</u> <u>(ug/L)</u>	<u>QUANTITATION</u> <u>LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DI-BROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: *JS*
Date Reported: 6-25-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8756583

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 500 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 06/17/87

Date of Report: 07/08/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUNNELLS
 Date Collected: 06/16/87 02:15:00

Sample Description: WATER, WELL SHALLOW
 Client Reference:

Comments

NEAR METRO EAST SLP KANE RES.
 DES MOINES METRO LANDFILL STUDY, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	13 DEGREES C		
pH VALUE (LAW)	7.6 pH UNITS	EPA 150.1	SMM
SPEC. CONDUCTANCE	610 uMHOS @ 25 C	EPA 120.1	DC
TOTAL ALKALINITY	263 MG/L AS CaCO3	EPA 310.1	SMM
TOTAL HARDNESS	272 MG/L AS CaCO3	EPA 130.2	SMM
DISSOLVED SOLIDS	350 MG/L @180 C	EPA 140.1	JGT
SUSPENDED SOLIDS	<1 MG/L @103 C	EPA 140.2	JGT
POTASSIUM	1.1 MG/L	EPA 258.1	HL
SODIUM	15 MG/L	EPA 200.7	SR
CHLORIDE	11 MG/L	EPA 325.3	DC
FLUORIDE	0.45 MG/L	USGS 14327	RWV
SULFATE	40 MG/L	EPA 275.4	SMM
AMMONIA (AS N)	<0.01 MG/L	EPA 350.1	RIP
NO2+NO3 AS NO3-N	0.1 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMD	0 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 204.2	DC
TOTAL BARIUM	<0.05 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CALCIUM	76 MG/L	EPA 200.7	SR
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pice Curies/Liter

Date of Report
07/08/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Page No.
02

Analytical Report for Sample Number 8756583

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	<0.01 MG/L	EPA 220.1	DC
IRON	0.20 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	20 MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.14 MG/L	EPA 200.7	SMM
TOTAL MERCURY	>0.001 MG/L	EPA 245.1	HL
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	DC
TOTAL SILVER	<0.0 MG/L	EPA 272.1	DC
TOTAL ZINC	0.05 MG/L	EPA 200.7	SR

Verified: *JH*

PPM - Parts/Million
PPB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Kane Farm - Shallow Well
Date Sample Collected: 6-16-87
Date Sample Received: 6-17-87

ANALYTICAL RESULTS

UHL Lab No. 8756583

<u>ANALYTE</u>	<u>CONCENTRATION</u> <u>(ug/L)</u>	<u>QUANTITATION</u> <u>LIMIT (ug/L)</u>
<u>VINYL CHLORIDE</u>	<u><1</u>	<u>1</u>
<u>1,1-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CIS- & TRANS-1,2-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CHLOROFORM</u>	<u><1</u>	<u>1</u>
<u>1,1,1-TRICHLOROETHANE</u>	<u><1</u>	<u>1</u>
<u>CARBON TETRACHLORIDE</u>	<u><1</u>	<u>1</u>
<u>BROMODICHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>TRICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>DIBROMOCHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>BENZENE</u>	<u><1</u>	<u>1</u>
<u>BROMOFORM</u>	<u><1</u>	<u>1</u>
<u>1,4-DICHLOROBENZENE</u>	<u><1</u>	<u>1</u>

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: *[Signature]*
Date Reported: 6-25-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8756582

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 06/17/87

Date of Report: 07/08/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUNNELLS
 Date Collected: 06/16/87 02:30:00

Sample Description: WATER, WELL SHALLOW
 Client Reference:

Comments

NEAR METRO EAST SLF LYLE CULLING RES
 DES MOINES METRO LANDFILL STUDY, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	16 DEGREES C		
pH VALUE (LAB)	7.6 pH UNITS	EPA 150.1	SMM
SPEC. CONDUCTANCE	720 uMHOS @ 25 C	EPA 120.1	DC
TOTAL ALKALINITY	226 MG/L AS CaCO3	EPA 310.1	SMM
TOTAL HARDNESS	314 MG/L AS CaCO3	EPA 130.2	SMM
DISSOLVED SOLIDS	400 MG/L @180 C	EPA 160.1	JGT
SUSPENDED SOLIDS	<1 MG/L @103 C	EPA 160.2	JGT
POTASSIUM	0.2 MG/L	EPA 250.1	ML
SODIUM	13 MG/L	EPA 200.7	SR
CHLORIDE	24 MG/L	EPA 325.3	DC
FLUORIDE	0.4 MG/L	USGS 14327	RWV
SULFATE	76 MG/L	EPA 275.4	SMM
AMMONIA (AS N)	<0.01 MG/L	EPA 350.1	RLP
NO2+NO3 AS NO3-N	6.3 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMD	8 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	DC
TOTAL BARIUM	0.08 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CALCIUM	96 MG/L	EPA 200.7	SMM
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

Date of Report
07/08/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 0754502

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	<0.01 MG/L	EPA 220.1	DC
IRON	0.02 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	10 MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	HL
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	DC
TOTAL SILVER	<0.01 MG/L	EPA 272.1	DC
TOTAL ZINC	0.35 MG/L	EPA 200.7	SR

Verified: *JA*

PPM - Parts/Million
PPB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
uG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
uG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Lyle Gulling Farm - Shallow Well
Date Sample Collected: 6-16-87
Date Sample Received: 6-17-87

ANALYTICAL RESULTS

UHL Lab No. 8756582

<u>ANALYTE</u>	<u>CONCENTRATION (ug/L)</u>	<u>QUANTITATION LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	2	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: *[Signature]*
Date Reported: 6-25-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8756581

Iowa City Laboratory
Oaksdale Hall
Iowa City, IA 52242
(319) 335-4500

Des Moines Branch
900 East Grand
H.A. Wallace Building
Des Moines, IA 50319
(515) 281-3371

Date Received: 06/17/87

Date of Report: 07/08/87

Submitter: EPD S
Address: WALLACE BLDG
City: DES MOINES, IA 50319

Sample Location: RUMNELLS
Date Collected: 06/16/87 02:30:00

Sample Description: WATER, WELL SHALLOW
Client Reference:

Comments

NEAR METRO EAST SLF LYLE GULLING RES, DUPLICATE SAMPLE
DES MOINES METRO LANDFILL STUDY, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
-----	-----	-----	-----
TEMPERATURE	14 DEGREES C		
pH VALUE (LAM)	7.5 pH UNITS	EPA 150.1	SMM
SPEC. CONDUCTANCE	720 uMHOS @ 25 C	EPA 120.1	DC
TOTAL ALKALINITY	226 MG/L AS CaCO3	EPA 310.1	SMM
TOTAL HARDNESS	315 MG/L AS CaCO3	EPA 130.2	SMM
DISSOLVED SOLIDS	400 MG/L @180 C	EPA 140.1	JGT
SUSPENDED SOLIDS	<1 MG/L @103 C	EPA 140.2	JGT
POTASSIUM	0.1 MG/L	EPA 250.1	ML
SODIUM	13 MG/L	EPA 200.7	SR
CHLORIDE	25 MG/L	EPA 325.3	DC
FLUORIDE	0.35 MG/L	USGS 14327	RWW
SULFATE	71 MG/L	EPA 275.4	SMM
AMMONIA (AS N)	<0.01 MG/L	EPA 350.1	RLP
NO2+NO3 AS NO3-N	7.0 MG/L	EPA 355.2	JAG
CHEMICAL OXYGEN DEMD	0 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	DC
TOTAL BARIUM	0.00 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CALCIUM	98 MG/L	EPA 200.7	SR
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPD - Parts/Million uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

Date of Report
07/08/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8754581

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	<0.01 MG/L	EPA 220.1	DC
IRON	<0.02 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	17 MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	HL
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	DC
TOTAL SILVER	<0.01 MG/L	EPA 272.1	DC
TOTAL ZINC	<0.02 MG/L	EPA 200.7	SR

Verified: *JH*

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
(- Less than) - Greater than pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Lyle Gulling - Shallow Well
Date Sample Collected: 6-16-87
Date Sample Received: 6-17-87

ANALYTICAL RESULTS

UHL Lab No. 8756581

<u>ANALYTE</u>	<u>CONCENTRATION</u> <u>(ug/L)</u>	<u>QUANTITATION</u> <u>LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: *[Signature]*
Date Reported: 6-25-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8756578

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 06/17/87

Date of Report: 07/08/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUNNELLS
 Date Collected: 06/16/87 02:40:00

Sample Description: WATER, WELL SHALLOW
 Client Reference:

Comments

NEAR METRO EAST SLP SLOAN RES.
 DES MOINES METRO LANDFILL STUDY, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	13 DEGREES C		
pH VALUE (LAB)	6.9 pH UNITS	EPA 150.1	SMH
SPEC CONDUCTANCE	460 uMHOS @ 25 C	EPA 120.1	DC
TOTAL ALKALINITY	115 MG/L AS CaCO3	EPA 310.1	SMH
TOTAL HARDNESS	189 MG/L AS CaCO3	EPA 130.2	SMH
DISSOLVED SOLIDS	260 MG/L @100 C	EPA 160.1	JGT
SUSPENDED SOLIDS	<1 MG/L @100 C	EPA 140.2	JGT
POTASSIUM	<0.1 MG/L	EPA 250.1	ML
SODIUM	9.5 MG/L	EPA 200.7	SR
CHLORIDE	22 MG/L	EPA 325.3	DC
FLUORIDE	0.15 MG/L	USGS 14327	RWW
SULFATE	44 MG/L	EPA 275.4	SMH
AMMONIA (AS N)	<0.01 MG/L	EPA 350.1	NLP
NO2+NO3 AS NO3-N	5.9 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMD	4 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	DC
TOTAL BARIUM	0.15 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CALCIUM	44 MG/L	EPA 200.7	SR
TOTAL CHROMIUM	<0.01 MG/L	EPA 213.2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

Date of Report
07/00/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8756578

Page No.
02

TEST	CONCENTRATION		METHOD USED	ANALYST
TOTAL COPPER	<0.01	MG/L	EPA 210.1	DC
IRON	<0.02	MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01	MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	10	MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02	MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001	MG/L	EPA 245.1	ML
TOTAL SELENIUM	<0.01	MG/L	EPA 270.2	DC
TOTAL SILVER	<0.01	MG/L	EPA 272.1	DC
TOTAL ZINC	0.07	MG/L	EPA 200.7	SR

Verified: 

PPM - Parts/Million
PPB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pice Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Sloan Res. - Shallow Well
Date Sample Collected: 6-16-87
Date Sample Received: 6-17-87

ANALYTICAL RESULTS

UHL Lab No. 8756528

<u>ANALYTE</u>	<u>CONCENTRATION</u> <u>(ug/L)</u>	<u>QUANTITATION</u> <u>LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: *[Signature]*
Date Reported: 6-25-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report (or Sample Number 8756379

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-3371

Date Received: 06/17/87

Date of Report: 07/08/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUMMELLS
 Date Collected: 06/16/87 02:50:00

Sample Description: WATER, WELL SHALLOW
 Client Reference:

Comments

NEAR METRO EAST SLY GULLING RES.
 DES MOINES METRO LANDFILL STUDY, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	15 DEGREES C		
pH VALUE (LAB)	7.5 pH UNITS	EPA 150.1	SMH
SPEC. CONDUCTANCE	510 uMHOS @ 25 C	EPA 120.1	DC
TOTAL ALKALINITY	170 MG/L AS CaCO3	EPA 310.1	SMH
TOTAL HARDNESS	225 MG/L AS CaCO3	EPA 130.2	SMH
DISSOLVED SOLIDS	300 MG/L @180 C	EPA 140.1	JGT
SUSPENDED SOLIDS	<1 MG/L @103 C	EPA 140.2	JGT
POTASSIUM	<0.1 MG/L	EPA 250.1	HL
SODIUM	9.5 MG/L	EPA 200.7	SR
CHLORIDE	7.0 MG/L	EPA 325.3	DC
FLUORIDE	0.25 MG/L	USCS 14327	RWW
SULFATE	54 MG/L	EPA 275.4	SMH
AMMONIA (AS N)	<0.01 MG/L	EPA 350.1	NLP
NO2+NO3 AS NO3-N	7.5 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMD	4 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	DC
TOTAL BARIUM	0.12 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CALCIUM	49 MG/L	EPA 200.7	SR
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

Date of Report
07/08/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8736579

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	<0.01 MG/L	EPA 220.1	DC
IRON	<0.02 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	25 MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	HL
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	DC
TOTAL SILVER	<0.01 MG/L	EPA 272.1	DC
TOTAL ZINC	0.73 MG/L	EPA 200.7	SR

Verified: 

PPM - Parts/Million
PPB - Parts/Billion
(- Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
) - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

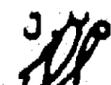
Client Sample Identification: Blanch Gulling - Shallow
Date Sample Collected: 6-16-87
Date Sample Received: 6-17-87

ANALYTICAL RESULTS

UHL Lab No. 8756579

<u>ANALYTE</u>	<u>CONCENTRATION</u> <u>(ug/L)</u>	<u>QUANTITATION</u> <u>LIMIT (ug/L)</u>
<u>VINYL CHLORIDE</u>	<u><1</u>	<u>1</u>
<u>1,1-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CIS- & TRANS-1,2-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CHLOROFORM</u>	<u><1</u>	<u>1</u>
<u>1,1,1-TRICHLOROETHANE</u>	<u><1</u>	<u>1</u>
<u>CARBON TETRACHLORIDE</u>	<u><1</u>	<u>1</u>
<u>BROMODICHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>TRICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>DIBROMOCHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>BENZENE</u>	<u><1</u>	<u>1</u>
<u>BROMOFORM</u>	<u><1</u>	<u>1</u>
<u>1,4-DICHLOROBENZENE</u>	<u><1</u>	<u>1</u>

Analytical Method: EPA Method 624

Analyst: J. Mader/J. Filkins
Verified: 
Date Reported: 6-25-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8754580

Iowa City Laboratory
Oakdale Hall
Iowa City, IA 52242
(319) 335-4500

Des Moines Branch
900 East Grand
H.A. Wallace Building
Des Moines, IA 50319
(515) 281-5371

Date Received: 06/17/87

Date of Report: 07/08/87

Submitter: EPD 5
Address: WALLACE BLDG
City: DES MOINES, IA 50319

Sample Location: RUNNELLS
Date Collected: 06/16/87 02:50:00

Sample Description: WATER, WELL SHALLOW
Client Reference:

Comments

NEAR METRO EAST SLF GULLING RES, PASTURE SHALLOW
DES MOINES METRO LANDFILL STUDY, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
-----	-----	-----	-----
TEMPERATURE	13 DEGREES C		
PH VALUE (LAB)	7.5 PH UNITS	EPA 150.1	SMH
SPEC. CONDUCTANCE	870 uMHOS @ 25 C	EPA 120.1	DC
TOTAL ALKALINITY	184 MG/L AS CaCO3	EPA 310.1	SMH
TOTAL HARDNESS	385 MG/L AS CaCO3	EPA 130.2	SMH
DISSOLVED SOLIDS	500 MG/L @180 C	EPA 160.1	JGT
SUSPENDED SOLIDS	<1 MG/L @103 C	EPA 160.2	JGT
POTASSIUM	1.8 MG/L	EPA 258.1	ML
SODIUM	17 MG/L	EPA 200.7	SR
CHLORIDE	44 MG/L	EPA 325.3	DC
FLUORIDE	0.2 MG/L	USGS 14327	RWV
SULFATE	86 MG/L	EPA 275.4	SMH
AMMONIA (AS-N)	<0.01 MG/L	EPA 350.1	RLP
NO2+NO3 AS NO3-N	23 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMD	6 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	DC
TOTAL BARIUM	0.10 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CALCIUM	86 MG/L	EPA 200.7	SR
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pice Curies/Liter

Date of Report
07/08/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8756580

Page No.
02

TEST	CONCENTRATION		METHOD USED	ANALYST
TOTAL COPPER	0.04	MG/L	EPA 220.1	DC
IRON	0.06	MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01	MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	41	MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02	MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001	MG/L	EPA 245.1	HL
TOTAL SELENIUM	<0.01	MG/L	EPA 270.2	DC
TOTAL SILVER	<0.01	MG/L	EPA 272.1	DC
TOTAL ZINC	1.0	MG/L	EPA 200.7	SR

Verified:

TF

PPM - Parts/Million
PPB - Parts/Billion
(- Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
) - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Blanch Gulling - Pasture, Shallow
Date Sample Collected: 6-16-87
Date Sample Received: 6-17-87

ANALYTICAL RESULTS

UHL Lab No. 8756580

<u>ANALYTE</u>	<u>CONCENTRATION</u> <u>(ug/L)</u>	<u>QUANTITATION</u> <u>LIMIT (ug/L)</u>
<u>VINYL CHLORIDE</u>	<u><1</u>	<u>1</u>
<u>1,1-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CIS- & TRANS-1,2-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CHLOROFORM</u>	<u><1</u>	<u>1</u>
<u>1,1,1-TRICHLOROETHANE</u>	<u><1</u>	<u>1</u>
<u>CARBON TETRACHLORIDE</u>	<u><1</u>	<u>1</u>
<u>BROMODICHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>TRICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>DIBROMOCHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>BENZENE</u>	<u><1</u>	<u>1</u>
<u>BROMOFORM</u>	<u><1</u>	<u>1</u>
<u>1,4-DICHLOROBENZENE</u>	<u><1</u>	<u>1</u>

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: *[Signature]*
Date Reported: 6-25-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8756639

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H. A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 06/17/87

Date of Report: 07/16/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUNNELLS
 Date Collected: 06/17/87 12:15:00

Sample Description: WELL WATER, SHALLOW
 Client Reference:

Comments

ADKINS RES.
 DES MOINES METRO LANDFILL STUDY WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
-----	-----	-----	-----
TEMPERATURE	13 DEGREES C.		
pH VALUE (LAB)	7.05 pH UNITS	EPA 150 1	SMM
SPEC. CONDUCTANCE	570 uMHOS @ 25 C	EPA 120 1	CLK/SMM
TOTAL ALKALINITY	151 MG/L AS CaCO3	EPA 310 1	SMM
TOTAL HARDNESS	245 MG/L AS CaCO3	EPA 120 2	SMM
DISSOLVED SOLIDS	300 MG/L @180 C	EPA 160 1	JGT
SUSPENDED SOLIDS	71 MG/L @103 C	EPA 160 2	JGT
POTASSIUM	0.1 MG/L	EPA 258 1	ML
SODIUM	7.1 MG/L	EPA 200 7	SR
CHLORIDE	15 MG/L	EPA 325 3	CLK/SMM
FLUORIDE	0.25 MG/L	USCB 14327	RWW
SULFATE	28 MG/L	EPA 275 4	SMM
AMMONIA (AS N)	0.1 MG/L	EPA 350 1	RLF
NO2+NO3-AS NO3-N	21 MG/L	EPA 353 2	JAG
CHEMICAL OXYGEN DEMAND	4 MG/L	EPA 410	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 206 2	DC
TOTAL BARIUM	0.12 MG/L	EPA 200 7	CR
TOTAL CADMIUM	<0.001 MG/L	EPA 213 2	DC
TOTAL CALCIUM	40 MG/L	EPA 200 7	CR
TOTAL CHROMIUM	<0.01 MG/L	EPA 219 2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pico/Curies/Liter

Date of Report
07/16/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Page No.
02

Analytical Report for Sample Number 8756639

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	<0.01 MG/L	EPA 220.1	DC
IRON	<0.02 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	23 MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 248.1	ML
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	DC
TOTAL SILVER	<0.01 MG/L	EPA 272.1	DC
TOTAL ZINC	<0.02 MG/L	EPA 200.7	SR

Verified MTF

PPM - Parts/Million
PPE - Parts/Million
< - Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Adkins - Shallow Well
Date Sample Collected: 6-17-87
Date Sample Received: 6-17-87

ANALYTICAL RESULTS

UHL Lab No. 8756639

<u>ANALYTE</u>	<u>CONCENTRATION (ug/L)</u>	<u>QUANTITATION LIMIT (ug/L)</u>
<u>VINYL CHLORIDE</u>	<u><1</u>	<u>1</u>
<u>1,1-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CIS- & TRANS-1,2-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CHLOROFORM</u>	<u><1</u>	<u>1</u>
<u>1,1,1-TRICHLOROETHANE</u>	<u><1</u>	<u>1</u>
<u>CARBON TETRACHLORIDE</u>	<u><1</u>	<u>1</u>
<u>BROMODICHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>TRICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>DIBROMOCHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>BENZENE</u>	<u><1</u>	<u>1</u>
<u>BROMOFORM</u>	<u><1</u>	<u>1</u>
<u>1,4-DICHLOROBENZENE</u>	<u><1</u>	<u>1</u>

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: *[Signature]*
Date Reported: 6-29-87

UNIVERSITY OF IOWA - HYGIENIC LA

 Analytical Report for Sample Number

*Corrected
 report*

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Date Received: 06/17/87

Date of Report: *June*

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUNNELLS
 Date Collected: 06/17/87 12:30:00

Sample Description: WALL WATER, WELLS
 Client Reference:

Comments

HARRY GAAS RES.
 DES MOINES METRO LANDFILL STUDY, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
pH VALUE (LAB)	7.2 pH UNITS	EPA 150.1	SMM
SPEC. CONDUCTANCE	1800 μ MHOS @ 25 C	EPA 120.1	CLK/SMM
TOTAL ALKALINITY	418 MG/L AS CaCO3	EPA 310.1	SMM
TOTAL HARDNESS	588 MG/L AS CaCO3	EPA 130.2	SMM
SUSPENDED SOLIDS	20 MG/L @103 C	EPA 140.2	JGT
POTASSIUM	12 MG/L	EPA 258.1	ML
SODIUM	180 MG/L	EPA 200.7	SR
CHLORIDE	3.0 MG/L	EPA 325.3	CLK/SMM
FLUORIDE	0.75 MG/L	USGS 14327	RWW
SULFATE	620 MG/L	EPA 275.4	SMM
AMMONIA (AS N)	3.3 MG/L	EPA 350.1	RLP
NO2+NO3 AS NO3-N	<0.1 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMD	8 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 204.2	DC
TOTAL BARIUM	<0.05 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CALCIUM	120 MG/L	EPA 200.7	SR
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC
TOTAL COPPER	<0.01 MG/L	EPA 220.1	DC
IRON	9.2 MG/L	EPA 200.7	SR

PFM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion μ G/L - Micrograms/Liter μ G/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pico Curies/Liter

Date of Report
08/03/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report (Ur Sample Number 075664)

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	64 MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.08 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	HL
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	DC
TOTAL SILVER	<0.01 MG/L	EPA 272.1	DC
TOTAL ZINC	0.40* MG/L	EPA 200.7	SR

Comments

INSUFFICIENT SAMPLE FOR DISSOLVED SOLIDS
ANALYSIS

*RESULT FOR TOTAL ZINC CORRECTED 8/03/87. -

Verified:

LP

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
< - Less than) - Greater than pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Harry Gass - Deep
Date Sample Collected: 6-17-87
Date Sample Received: 6-17-87

ANALYTICAL RESULTS

UHL Lab No. 8256641

<u>ANALYTE</u>	<u>CONCENTRATION (ug/L)</u>	<u>QUANTITATION LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: 
Date Reported: 6-29-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8756640

Iowa City Laboratory
Oakdale Hall
Iowa City, IA 52242
(319) 335-4500

Des Moines Branch
900 East Grand
H.A. Wallace Building
Des Moines, IA 50319
(515) 281-5371

Date Received: 06/17/87

Date of Report: 07/16/87

Submitter: EPD 5
Address: WALLACE BLDG
City: DES MOINES, IA 50319

Sample Location: RUNNELLS
Date Collected: 06/17/87 12:30:00

Sample Description: WELL WATER, SHALLOW
Client Reference:

Comments

HARRY GAAS REE
DES MOINES METRO LANDFILL STUDY WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
pH VALUE (LAB)	7.3 pH UNITS	EPA 150 1	SMM
SPEC. CONDUCTANCE	1100 UMHOBS @ 25 C	EPA 120 1	CLK/SMM
TOTAL ALKALINITY	271 MG/L AS CaCO3	EPA 310 1	
TOTAL HARDNESS	468 MG/L AS CaCO3	EPA 130 2	SMM
DISSOLVED SOLIDS	750 MG/L @190 C	EPA 160 1	JGT
SUSPENDED SOLIDS	<1 MG/L @100 C	EPA 160 2	JGT
POTASSIUM	0.5 MG/L	EPA 250 1	ML
SODIUM	43 MG/L	EPA 200 7	CR
CHLORIDE	32 MG/L	EPA 325 3	CLK/SMM
FLUORIDE	0.3 MG/L	USGS 14327	RWW
SULFATE	230 MG/L	EPA 275 4	SMM
AMMONIA (AS N)	0.1 MG/L	EPA 350 1	RLP
NO2+NO3 AS NO3-N	1.7 MG/L	EPA 353 2	JAG
CHEMICAL OXYGEN DEMAND	4 MG/L	EPA 410 1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 206 2	DC
TOTAL BARIUM	0.08 MG/L	EPA 200 7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213 2	DC
TOTAL CALCIUM	110 MG/L	EPA 200 7	CR
TOTAL CHROMIUM	<0.01 MG/L	EPA 218 2	DC
TOTAL COPPER	0.02 MG/L	EPA 220 1	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion UG/L - Micrograms/Liter UG/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pico/Curies/Liter

Date of Report
07/16/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY
Analytical Report for Sample Number 8756440

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYST
IRON	0.16 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	47 MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	ML
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	DC
TOTAL SILVER	<0.01 MG/L	EPA 272.1	DC
TOTAL ZINC	1.4 MG/L	EPA 200.7	SR

Verified: MTF

PPM - Parts/Million
PPB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
uG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
uG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Harry Gass - Shallow Well
Date Sample Collected: 6-17-87
Date Sample Received: 6-17-87

ANALYTICAL RESULTS

UHL Lab No. 8756640

ANALYTE	CONCENTRATION (ug/L)	QUANTITATION LIMIT (ug/L)
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	14	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	7	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	7	1
BENZENE	<1	1
BROMOFORM	2	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Xoder/J. Filkins
Verified: *[Signature]*
Date Reported: 6-29-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8754588

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 06/17/87

Date of Report: 07/08/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
 Date Collected: 06/16/87 11:45:00

Sample Description: WATER, WELL DEEP
 Client Reference:

Comments

NEAR METRO EAST SLF MARK SAMPSON RES.
 DES MOINES METRO LANDFILL STUDY, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	16 DEGREES C		
pH VALUE (LAB)	7.55 pH UNITS	EPA 150.1	SMH
SPEC. CONDUCTANCE	1400 uMHOS @ 25 C	EPA 120.1	DC
TOTAL ALKALINITY	383 MG/L AS CaCO3	EPA 910.1	SMH
TOTAL HARDNESS	434 MG/L AS CaCO3	EPA 130.2	SMH
DISSOLVED SOLIDS	1070 MG/L @180 C	EPA 160.1	JGT
SUSPENDED SOLIDS	28 MG/L @103 C	EPA 160.2	JGT
POTASSIUM	8.0 MG/L	EPA 258.1	HL
SODIUM	120 MG/L	EPA 200.7	SR
CHLORIDE	7.0 MG/L	EPA 325.3	DC
FLUORIDE	1.0 MG/L	USGS 14327	RWW
SULFATE	480 MG/L	EPA 275.4	SMH
AMMONIA (AS N)	5.2 MG/L	EPA 350.1	NLP
NO2+NO3 AS NO3-N	<0.1 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMD	12 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	DC
TOTAL BARIUM	<0.05 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CALCIUM	150 MG/L	EPA 200.7	SR
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pico Curies/Liter

Date of Report
07/08/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8756588

Page No.
02

TEST	CONCENTRATION		METHOD USED	ANALYST
-----	-----	-----	-----	-----
TOTAL COPPER	<0.01	MG/L	EPA 220.1	DC
IRON	16	MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01	MG/L	239.2	DC
TOTAL MAGNESIUM	56	MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.10	MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001	MG/L	EPA 245.1	HL
TOTAL SELENIUM	<0.01	MG/L	EPA 270.2	DC
TOTAL SILVER	<0.01	MG/L	EPA 272.1	DC
TOTAL ZINC	2.7	MG/L	EPA 200.7	SR

Verified: *TP*

PPM - Parts/Million
PPB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Sampson Residence - Deep Well
Date Sample Collected: 6-16-87
Date Sample Received: 6-17-87

ANALYTICAL RESULTS

UHL Lab No. 8256588

<u>ANALYTE</u>	<u>CONCENTRATION</u> <u>(ug/L)</u>	<u>QUANTITATION</u> <u>LIMIT (ug/L)</u>
<u>VINYL CHLORIDE</u>	<u><1</u>	<u>1</u>
<u>1,1-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CIS- & TRANS-1,2-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CHLOROFORM</u>	<u><1</u>	<u>1</u>
<u>1,1,1-TRICHLOROETHANE</u>	<u><1</u>	<u>1</u>
<u>CARBON TETRACHLORIDE</u>	<u><1</u>	<u>1</u>
<u>BROMODICHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>TRICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>DIBROMOCHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>BENZENE</u>	<u><1</u>	<u>1</u>
<u>BROMOFORM</u>	<u><1</u>	<u>1</u>
<u>1,4-DICHLOROBENZENE</u>	<u><1</u>	<u>1</u>

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: *[Signature]*
Date Reported: 6-29-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8756436

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H A Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 06/17/87

Date of Report: 07/16/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUNNELLS
 Date Collected: 06/17/87 10:40:00

Sample Description: WELL WATER, SHALLOW
 Client Reference:

Comments

WAYNE MILLER RES
 DES MOINES METRO LANDFILL STUDY WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	15 DEGREES C		
pH VALUE (LAB)	7.5 pH UNITS	EPA 150 1	BMM
SPEC CONDUCTANCE	860 uMHOS @ 25 C	EPA 120 1	CLK/BMM
TOTAL ALKALINITY	280 MG/L AS CaCO3	EPA 310 1	BMM
TOTAL HARDNESS	404 MG/L AS CaCO3	EPA 130 2	BMM
DISSOLVED SOLIDS	500 MG/L @180 C	EPA 160 1	JCT
SUSPENDED SOLIDS	9 MG/L @103 C	EPA 160 2	JCT
POTASSIUM	0.4 MG/L	EPA 250 1	KL
SODIUM	9.0 MG/L	EPA 200 7	SR
CHLORIDE	25 MG/L	EPA 325 2	CLK/BMM
FLUORIDE	0.55 MG/L	USECS 14027	RWW
SULFATE	61 MG/L	EPA 275 4	BMM
AMMONIA (AS N)	0.1 MG/L	EPA 350 1	RLP
NO2+NO3-AS NO3-N	18 MG/L	EPA 352 2	JAC
CHEMICAL OXYGEN DEMD	4 MG/L	EPA 410 1	JAC
TOTAL ARSENIC	< 0.01 MG/L	EPA 206 2	DC
TOTAL BARIUM	0.12 MG/L	EPA 200 7	SR
TOTAL CADMIUM	< 0.001 MG/L	EPA 213 2	DC
TOTAL CALCIUM	99 MG/L	EPA 200 7	SR
TOTAL CHROMIUM	< 0.01 MG/L	EPA 318 2	DC

PPM - Parts/Million
 PPB - Parts/Billion
 < - Less than

MG/L - Milligrams/Liter
 uG/L - Micrograms/Liter
 > - Greater than

MG/KG - Milligrams/Kilogram
 uG/KG - Micrograms/Kilogram
 pCi/L - pico/Curies/Liter

Date of Report
07/16/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Page No.
02

Analytical Report for Sample Number 0756636

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	0.04 MG/L	EPA 220.1	DC
IRON	0.02 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	30 MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	ML
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	DC
TOTAL SILVER	<0.01 MG/L	EPA 272.1	DC
TOTAL ZINC	0.11 MG/L	EPA 200.7	SR

Verified MTF

PPM - Parts/Million

MG/L - Milligrams/Liter

MG/KG - Milligrams/Kilogram

PBB - Parts/Billion

UG/L - Micrograms/Liter

UG/KG - Micrograms/Kilogram

(- Less than

) - Greater than

pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Wayne Miller - Shallow Well
Date Sample Collected: 6-17-87
Date Sample Received: 6-17-87

ANALYTICAL RESULTS

UHL Lab No. 8756636

<u>ANALYTE</u>	<u>CONCENTRATION</u> <u>(ug/L)</u>	<u>QUANTITATION</u> <u>LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: *[Signature]*
Date Reported: 6-29-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8756627

Iowa City Laboratory
Oakdale Hall
Iowa City, IA 52242
(319) 335-4500

Des Moines Branch
900 East Grand
H A Wallace Building
Des Moines, IA 50319
(515) 251-5371

Date Received: 06/17/87

Date of Report: 07/16/87

Submitter: EPD 5
Address: WALLACE BLDG
City: DES MOINES, IA 50319

Sample Location: RUNNELLS
Date Collected: 06/17/87 10:40:00

Sample Description: WELL WATER, DEEP
Client Reference:

Comments

WAYNE MILLER RES
DES MOINES METRO LANDFILL STUDY, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	11 DEGREES C		SG
PH VALUE (LAE)	7.8 PH UNITS	EPA 150 1	SMM
SPEC CONDUCTANCE	2900 UMHOS @ 25 C	EPA 120 1	CLK/SMM
TOTAL ALKALINITY	323 MG/L AS CaCO3	EPA 310 1	SMM
TOTAL HARDNESS	235 MG/L AS CaCO3	EPA 130 2	SMM
DISSOLVED SOLIDS	2220 MG/L @100 C	EPA 160 1	JGT
SUSPENDED SOLIDS	6 MG/L @103 C	EPA 160 2	JGT
POTASSIUM	8.1 MG/L	EPA 250 1	ML
SODIUM	690 MG/L	EPA 200 7	SR
CHLORIDE	97 MG/L	EPA 325 3	CLK/SMM
FLUORIDE	2.4 MG/L	USGS 14327	RWW
SULFATE	1300 MG/L	EPA 275 4	SMM
AMMONIA (AS N)	1.7 MG/L	EPA 350 1	RLP
NO2-NO3 AS NO3-N	40.1 MG/L	EPA 352 2	JAC
CHEMICAL OXYGEN DEMAND	4 MG/L	EPA 410 1	JAC
TOTAL ARSENIC	10.01 MG/L	EPA 206 2	DC
TOTAL BARIUM	40.05 MG/L	EPA 200 7	SR
TOTAL CADMIUM	40.001 MG/L	EPA 212 2	DC
TOTAL CALCIUM	50 MG/L	EPA 200 7	SR
TOTAL CHROMIUM	40.01 MG/L	EPA 218 2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion UG/L - Micrograms/Liter UG/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pico Curies/Liter

Date of Report
07/16/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Page No
02

Analytical Report for Sample Number 8756637

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	0.04 MG/L	EPA 220.1	DC
IRON	2.3 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	2.1 MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.08 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	ML
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	DC
TOTAL SILVER	<0.01 MG/L	EPA 272.1	DC
TOTAL ZINC	0.18 MG/L	EPA 200.7	SR

Verified MTE

PPM - Parts/Million
PPB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Wayne Miller - Deep Well
Date Sample Collected: 6-17-87
Date Sample Received: 6-17-87

ANALYTICAL RESULTS

UHL Lab No. 8756637

ANALYTE	CONCENTRATION (ug/L)	QUANTITATION LIMIT (ug/L)
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: 
Date Reported: 6-29-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 0756638

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H A Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 06/17/87

Date of Report: 07/16/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUNNELLS
 Date Collected: 06/17/87 11:05:00

Sample Description: WELL WATER, SHALLOW
 Client Reference:

Comments

DON MILLER RES
 DES MOINES METRO LANDFILL STUDY WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
PH VALUE (LAB)	6.9 PH UNITS	EPA 150.1	SMM
SPEC CONDUCTANCE	1000 uMHOS @ 25 C	EPA 120.1	CLK/SMM
TOTAL ALKALINITY	209 MG/L AS CaCO3	EPA 310.1	SMM
TOTAL HARDNESS	464 MG/L AS CaCO3	EPA 130.2	SMM
DISSOLVED SOLIDS	560 MG/L @180 C	EPA 160.1	JCT
SUSPENDED SOLIDS	71 MG/L @100 C	EPA 160.2	JCT
POTASSIUM	0.3 MG/L	EPA 258.1	ML
SODIUM	1.4 MG/L	EPA 200.7	BR
CHLORIDE	50 MG/L	EPA 325.3	CLK/SMM
FLUORIDE	0.3 MG/L	UGGS 14327	RWW
SULFATE	95 MG/L	EPA 275.4	SMM
AMMONIA (AS N)	0.2 MG/L	EPA 350.1	RLP
NO2+NO3 AS NO3-N	43 MG/L	EPA 353.2	JAC
CHEMICAL OXYGEN DEMD	8 MG/L	EPA 410.1	JAC
TOTAL ARSENIC	<0.01 MG/L	EPA 204.2	DC
TOTAL BARIUM	0.07 MG/L	EPA 200.7	BR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CALCIUM	110 MG/L	EPA 200.7	BR
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC
TOTAL COPPER	0.07 MG/L	EPA 220.1	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPE - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pico/Curies/Liter

Date of Report
07/16/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8756638

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYSIS
IRON	< 0.02 MG/L	EPA 200.7	SR
TOTAL LEAD	< 0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	46 MG/L	EPA 200.7	SR
TOTAL MANGANESE	< 0.02 MG/L	EPA 200.7	ER
TOTAL MERCURY	< 0.001 MG/L	EPA 245.1	ML
TOTAL NICKEL	< 0.05 MG/L	EPA 200.7	ER
TOTAL SELENIUM	< 0.01 MG/L	EPA 270.2	DC
TOTAL SILVER	< 0.01 MG/L	EPA 272.1	DC
TOTAL ZINC	0.02 MG/L	EPA 200.7	SR

Verified: MTF

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
PBB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
< - Less than > - Greater than pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Dan Miller - Shallow Well
Date Sample Collected: 6-17-87
Date Sample Received: 6-17-87

ANALYTICAL RESULTS

UHL Lab No. B756638

<u>ANALYTE</u>	<u>CONCENTRATION (ug/L)</u>	<u>QUANTITATION LIMIT (ug/L)</u>
<u>VINYL CHLORIDE</u>	<u><1</u>	<u>1</u>
<u>1,1-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CIS- & TRANS-1,2-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CHLOROFORM</u>	<u><1</u>	<u>1</u>
<u>1,1,1-TRICHLOROETHANE</u>	<u><1</u>	<u>1</u>
<u>CARBON TETRACHLORIDE</u>	<u><1</u>	<u>1</u>
<u>BROMODICHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>TRICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>DIBROMOCHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>BENZENE</u>	<u><1</u>	<u>1</u>
<u>BROMOFORM</u>	<u><1</u>	<u>1</u>
<u>1,4-DICHLOROBENZENE</u>	<u><1</u>	<u>1</u>

Analytical Method: EPA Method 624

Analyst: J. Xader/J. Filkin
Verified: 
Date Reported: 6-29-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 0756634

Iowa City Laboratory
Oakdale Hall
Iowa City, IA 52242
(319) 335-4500

Des Moines Branch
900 East Grand
H. A. Wallace Building
Des Moines, IA 50319
(515) 281-5371

Date Received: 06/17/87

Date of Report: 07/16/87

Submitter: EPD 5
Address: WALLACE BLDG
City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
Date Collected: 06/17/87 09:30:00

Sample Description: WELL WATER SHALLOW
Client Reference:

Comments

MIKE JOHNSTON
DES MOINES METRO LANDFILL STUDY WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	12 DEGREES C.		
PH VALUE (LAB)	7.5 PH UNITS	EPA 150 1	SMM
SPEC CONDUCTANCE	940 UMHOBS @ 25 C	EPA 120 1	CLK/SMM
TOTAL ALKALINITY	202 MG/L AS CaCO3	EPA 310 1	SMM
TOTAL HARDNESS	374 MG/L AS CaCO3	EPA 130 2	SMM
DISSOLVED SOLIDS	560 MG/L @180 C	EPA 140 1	JGT
SUSPENDED SOLIDS	1 MG/L @103 C	EPA 160 2	JGT
POTASSIUM	0.2 MG/L	EPA 250 1	ML
SODIUM	38 MG/L	EPA 200 7	SR
CHLORIDE	42 MG/L	EPA 325 3	CLK/SMM
FLUORIDE	0.35 MG/L	USGS 14327	RWW
SULFATE	66 MG/L	EPA 275 4	SMM
AMMONIA (AS N)	0.2 MG/L	EPA 250 1	RLP
NO2+NO3 AS NO3-N	2.1 MG/L	EPA 353 2	JAC
CHEMICAL OXYGEN DEMD	8 MG/L	EPA 410 1	JAC
TOTAL ARSENIC	< 0.01 MG/L	EPA 206 2	DC
TOTAL BARIUM	0.16 MG/L	EPA 200 7	SR
TOTAL CADMIUM	< 0.001 MG/L	EPA 213 2	DC
TOTAL CALCIUM	97 MG/L	EPA 200 7	SR
TOTAL CHROMIUM	< 0.01 MG/L	EPA 218 2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MC/KG - Milligrams/Kilogram
 PPE - Parts/Billion UG/L - Micrograms/Liter UG/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pico Curies/Liter

Date of Report
07/16/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY
Analytical Report for Sample Number 8754634

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	< 0.01 MG/L	EPA 220.1	DC
IRON	0.19 MG/L	EPA 300.7	BR
TOTAL LEAD	< 0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	32 MG/L	EPA 200.7	BR
TOTAL MANGANESE	< 0.02 MG/L	EPA 200.7	BR
TOTAL MERCURY	< 0.001 MG/L	EPA 243.1	ML
TOTAL NICKEL	< 0.05 MG/L	EPA 200.7	BR
TOTAL SELENIUM	< 0.01 MG/L	EPA 270.2	DC
TOTAL SILVER	< 0.01 MG/L	EPA 272.1	DC
TOTAL ZINC	1.1 MG/L	EPA 300.7	BR

Verified MTF

PPM - Parts/Million
PPE - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Mike Johnston - Shallow
Date Sample Collected: 6-17-87
Date Sample Received: 6-17-87

ANALYTICAL RESULTS

UHL Lab No. 8756634

<u>ANALYTE</u>	<u>CONCENTRATION</u> <u>(ug/L)</u>	<u>QUANTITATION</u> <u>LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: *[Signature]*
Date Reported: 6-29-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8754633

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H A Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 06/17/87

Date of Report 07/16/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
 Date Collected: 06/17/87 09:30 00

Sample Description: WELL WATER DEEP
 Client Reference:

Comments

MIKE JOHNSTON RES.
 DES MOINES METRO LANDFILL STUDY, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	13 DEGREES C		
PH VALUE (LAB)	7.6 PH UNITS	EPA 150 1	BMM
SPEC CONDUCTANCE	200 UMHOS @ 25 C	EPA 120 1	CLK/BMM
TOTAL ALKALINITY	516 MG/L AS CaCO3	EPA 310 1	BMM
TOTAL HARDNESS	486 MG/L AS CaCO3	EPA 120 2	BMM
DISSOLVED SOLIDS	750 MG/L @180 C	EPA 160 1	JGT
SUSPENDED SOLIDS	10 MG/L @100 C	EPA 160 2	JGT
POTASSIUM	18 MG/L	EPA 250 1	NL
SODIUM	70 MG/L	EPA 200 7	SR
CHLORIDE	65 MG/L	EPA 325 3	CLK/BMM
FLUORIDE	0.25 MG/L	USGS 14327	RWW
SULFATE	160 MG/L	EPA 275 4	BMM
AMMONIA (AS N)	3.0 MG/L	EPA 350 1	RLP
NO2-NO3 AS NO3-N	<0.1 MG/L	EPA 353 2	JAC
CHEMICAL OXYGEN DEMD	8 MG/L	EPA 410 1	JAC
TOTAL ARSENIC	<0.01 MG/L	EPA 204 2	DC
TOTAL BARIUM	<0.05 MG/L	EPA 200 7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213 2	DC
TOTAL CALCIUM	120 MG/L	EPA 200 7	SR
TOTAL CHROMIUM	<0.01 MG/L	EPA 210 2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

Date of Report
07/16/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Page No.
02

Analytical Report for Sample Number 8756633

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	< 0.01 MG/L	EPA 220 1	DC
IRON	2.9 MG/L	EPA 200 7	SR
TOTAL LEAD	< 0.01 MG/L	EPA 239 2	DC
TOTAL MAGNESIUM	44 MG/L	EPA 200 7	SR
TOTAL MANGANESE	0.17 MG/L	EPA 200 7	SR
TOTAL MERCURY	< 0.001 MG/L	EPA 245 1	ML
TOTAL NICKEL	< 0.05 MG/L	EPA 200 7	SR
TOTAL SELENIUM	< 0.01 MG/L	EPA 270 2	DC
TOTAL SILVER	< 0.01 MG/L	EPA 272 1	DC
TOTAL ZINC	0.76 MG/L	EPA 200 7	SR

Verified MTF

PPM - Parts/Million
PPE - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
uG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
uG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Mike Johnston - Deep Well
Date Sample Collected: 6-17-87
Date Sample Received: 6-17-87

ANALYTICAL RESULTS

UHL Lab No. 8756633

<u>ANALYTE</u>	<u>CONCENTRATION</u> <u>(ug/L)</u>	<u>QUANTITATION</u> <u>LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkin
Verified: 
Date Reported: 6-29-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 875463

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H A Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 06/17/87

Date of Report: 07/16/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
 Date Collected: 06/17/87 09:30 00

Sample Description: WELL WATER, SHALLOW
 Client Reference:

Comments

MIKE JOHNSTON SHALLOW FIELD WELL
 DES MOINES METRO LANDFILL STUDY WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	13 DEGREES C.		
PH VALUE (LAB)	7.4 PH UNITS	EPA 150 1	SMM
SPEC CONDUCTANCE	540 UMHOBS @ 25 C	EPA 120 1	CLK/SMM
TOTAL ALKALINITY	201 MG/L AS CaCO3	EPA 310 1	SMM
TOTAL HARDNESS	240 MG/L AS CaCO3	EPA 130 2	SMM
DISSOLVED SOLIDS	290 MG/L @180 C	EPA 140 1	JGT
SUSPENDED SOLIDS	3 MG/L @103 C	EPA 160 2	JGT
POTASSIUM	1.0 MG/L	EPA 250 1	ML
SODIUM	7.2 MG/L	EPA 200 7	SR
CHLORIDE	23 MG/L	EPA 325 3	CLK/SMM
FLUORIDE	0.3 MG/L	USGS 14327	RWW
SULFATE	27 MG/L	EPA 275 4	SMM
AMMONIA (AS N)	<0.01 MG/L	EPA 250 1	RLS
NO2-NOS AS NO3-N	4.2 MG/L	EPA 353 2	JAC
CHEMICAL OXYGEN DEMD	4 MG/L	EPA 410 1	JAC
TOTAL ARSENIC	<0.01 MG/L	EPA 206 2	DC
TOTAL BARIUM	0.7 MG/L	EPA 200 7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213 2	DC
TOTAL CALCIUM	65 MG/L	EPA 200 7	SR
TOTAL CHROMIUM	<0.01 MG/L	EPA 210 2	DC

PPM - Parts/Million
 PPB - Parts/Billion
 < - Less than

MG/L - Milligrams/Liter
 UG/L - Micrograms/Liter
 > - Greater than

MG/KG - Milligrams/Kilogram
 UG/KG - Micrograms/Kilogram
 pCi/L - pico Curies/Liter

Date of Report
07/16/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Page No.

Analytical Report for Sample Number 87S6632

02

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	< 0.01 MG/L	EPA 220 1	DL
IRON	0.02 MG/L	EPA 200 7	BR
TOTAL LEAD	< 0.01 MG/L	EPA 239 2	DC
TOTAL MAGNESIUM	19 MG/L	EPA 200 7	BR
TOTAL MANGANESE	0.05 MG/L	EPA 200 7	BR
TOTAL MERCURY	< 0.001 MG/L	EPA 245 1	ML
TOTAL NICKEL	< 0.05 MG/L	EPA 200 7	BR
TOTAL SELENIUM	< 0.01 MG/L	EPA 270 2	DC
TOTAL SILVER	< 0.01 MG/L	EPA 272 1	DC
TOTAL ZINC	< 0.02 MG/L	EPA 200 7	BR

Verified: MTF

PPM - Parts/Million
PBB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico/Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Mike Johnston - Shallow Field Well
Date Sample Collected: 6-17-87
Date Sample Received: 6-17-87

ANALYTICAL RESULTS

UHL Lab No. 8256632

<u>ANALYTE</u>	<u>CONCENTRATION</u> <u>(ug/L)</u>	<u>QUANTITATION</u> <u>LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CIS- & TRANS-1,2-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
TRICHLOROETHENE	<1	1
DI-BROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
1,4-DICHLOROBENZENE	<1	1

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: *[Signature]*
Date Reported: 6-29-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8756635

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 06/17/87

Date of Report: 07/16/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
 Date Collected: 06/17/87 10:15:00

Sample Description: WELL WATER DEEP
 Client Reference:

Comments

SOUTTER
 DES MOINES METRO LANDFILL STUDY WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
TEMPERATURE	19 DEGREES C		
PH VALUE (LAB)	7.5 PH UNITS	EPA 150 1	SMM
SPEC CONDUCTANCE	2000 UMHOS @ 25 C	EPA 120 1	CLK/SMM
TOTAL ALKALINITY	453 MG/L AS CaCO3	EPA 310 1	SMM
TOTAL HARDNESS	377 MG/L AS CaCO3	EPA 130 2	EMM
DISSOLVED SOLIDS	1350 MG/L @180 C	EPA 160 1	JGT
SUSPENDED SOLIDS	6 MG/L @103 C	EPA 160 2	JGT
POTASSIUM	7.9 MG/L	EPA 258 1	ML
SODIUM	320 MG/L	EPA 200 7	BR
CHLORIDE	4.0 MG/L	EPA 325 3	CLK/SMM
FLUORIDE	1.2 MG/L	USEE 14327	RWW
SULFATE	610 MG/L	EPA 275 4	SMM
AMMONIA (AS N)	2.2 MG/L	EPA 350 1	RLP
NO2+NO3 AS NO3-N	10.1 MG/L	EPA 353 2	JAC
CHEMICAL OXYGEN DEMD	4 MG/L	EPA 410 1	JAC
TOTAL ARSENIC	< 0.01 MG/L	EPA 206 2	DC
TOTAL BARIUM	< 0.05 MG/L	EPA 200 7	BR
TOTAL CADMIUM	< 0.001 MG/L	EPA 213 2	DC
TOTAL CALCIUM	93 MG/L	EPA 200 7	BR
TOTAL CHROMIUM	< 0.01 MG/L	EPA 218 2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MC/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pico Curies/Liter

Date of Report
07/16/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Page No.
02

Analytical Report for Sample Number 8756635

TEST	CONCENTRATION	METHOD USED	ANALYSIS
TOTAL COPPER	<0.01 MG/L	EPA 220.1	DC
IRON	2.7 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.3	DC
TOTAL MAGNESIUM	34 MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	ML
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	DR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	DC
TOTAL SILVER	<0.01 MG/L	EPA 272.1	DC
TOTAL ZINC	0.17 MG/L	EPA 200.7	SR

Verified: MTF

PPM - Parts/Million
PPE - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
PCI/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 4000

Client: Iowa Dept. of Natural Resources, Field Office 5
Client Address: 900 E. Grand
Des Moines, IA 50319

Client Sample Identification: Sontter Res. - Deep Well
Date Sample Collected: 6-17-87
Date Sample Received: 6-17-87

ANALYTICAL RESULTS

UHL Lab No. 8756635

<u>ANALYTE</u>	<u>CONCENTRATION</u> <u>(ug/L)</u>	<u>QUANTITATION</u> <u>LIMIT (ug/L)</u>
<u>VINYL CHLORIDE</u>	<u><1</u>	<u>1</u>
<u>1,1-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CIS- & TRANS-1,2-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CHLOROFORM</u>	<u><1</u>	<u>1</u>
<u>1,1,1-TRICHLOROETHANE</u>	<u><1</u>	<u>1</u>
<u>CARBON TETRACHLORIDE</u>	<u><1</u>	<u>1</u>
<u>BROMODICHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>TRICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>DIBROMOCHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>BENZENE</u>	<u><1</u>	<u>1</u>
<u>BROMOFORM</u>	<u><1</u>	<u>1</u>
<u>1,4-DICHLOROBENZENE</u>	<u><1</u>	<u>1</u>

Analytical Method: EPA Method 624

Analyst: J. Yoder/J. Filkins
Verified: *[Signature]*
Date Reported: 6-29-87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8757833

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 07/15/87

Date of Report: 08/03/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUNNELLS
 Date Collected: 07/14/87 10:00:00

Sample Description: WATER, SHALLOW WELL
 Client Reference:

Comments

DEGROOT RES
 METRO EAST LANDFILL, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
pH VALUE (LAB)	7.35	pH UNITS	EPA 150.1 CLK
SPEC. CONDUCTANCE	1400	uMHOS @ 25 C	EPA 120.1 CLK
PHEN. ALKALINITY	NONE	MG/L AS CaCO3	EPA 310.1
TOTAL ALKALINITY	325	MG/L AS CaCO3	EPA 310.1 CLK
TOTAL HARDNESS	678	MG/L AS CaCO3	EPA 130.2 CLK
DISSOLVED SOLIDS	830	MG/L @180 C	EPA 160.1 JGT
SUSPENDED SOLIDS	<1	MG/L @103 C	EPA 160.2 JGT
POTASSIUM	<0.1	MG/L	EPA 258.1 ML
SODIUM	18	MG/L	EPA 200.7 SR
CHLORIDE	38	MG/L	EPA 325.3 CLK
FLUORIDE	0.25	MG/L	USGS 14327 RW
SULFATE	140	MG/L	EPA 275.4 BMM
AMMONIA (AS N)	<0.1	MG/L	EPA 350.1 RW
NO2+NO3 AS NO3-N	51	MG/L	EPA 353.2 JAG
CHEMICAL OXYGEN DMND	14	MG/L	EPA 410.1 JAG
TOTAL ARSENIC	<0.01	MG/L	EPA 206.2 ML
TOTAL BARIUM	0.13	MG/L	EPA 200.7 SR
TOTAL CADMIUM	<0.001	MG/L	EPA 213.2 DC
TOTAL CALCIUM	160	MG/L	EPA 200.7 SR
TOTAL CHROMIUM	<0.01	MG/L	EPA 218.2 LAF

PPM - Parts/Million
 PPB - Parts/Billion
 < - Less than

MG/L - Milligrams/Liter
 uG/L - Micrograms/Liter
 > - Greater than

MG/KG - Milligrams/Kilogram
 uG/KG - Micrograms/Kilogram
 pCi/L - pico Curies/Liter

Date of Report
08/03/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY
Analytical Report for Sample Number 8757533

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	0.03 MG/L	EPA 220.1	HL
IRON	0.04 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	59 MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	HL
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	HL
TOTAL SILVER	<0.01 MG/L	EPA 272.1	HL
TOTAL ZINC	0.13 MG/L	EPA 200.7	SR

Verified: MTF/LG

PPM - Parts/Million
PPB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
uG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
uG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 1020

Client: Iowa DNR Attn: Steve Grgurich
Client Address: F.O. #5
Des Moines, Iowa 50319

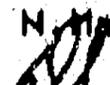
Project Identification: Metro East SLF Private Well Sampling
Client Sample Identification: De Groot Residence
Date Sample Collected: 7/14/87
Date Sample Received: 7/15/87

ANALYTICAL RESULTS

UHL Lab No. 8757833

ANALYTE	CONCENTRATION (ug/L)	QUANTITATION LIMIT (ug/L)
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,2-DICHLOROETHANE	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMOCHLOROMETHANE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
p-DICHLOROBENZENE	<1	1
TRICHLOROETHENE	<1	1

Analytical Method: EPA Method 524

Analyst: N. Mattix
Verified: 
Date Reported: 07/30/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8757825

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 07/13/87

Date of Report: 08/03/87

Submitter: EPD 9
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
 Date Collected: 07/14/87 10:30:00

Sample Description: WATER, DEEP WELL
 Client Reference:

Comments

VOGELAR FARM
 METRO EAST LANDFILL, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYSIS
pH VALUE (LAB)	7.85	pH UNITS.	EPA 150.1 CLK
SPEC. CONDUCTANCE	1300	uMHOS @ 25 C	EPA 120.1 CLK
PHEN. ALKALINITY	NONE	MG/L AS CaCO3	EPA 310.1 CLK
TOTAL ALKALINITY	511	MG/L AS CaCO3	EPA 310.1 CLK
TOTAL HARDNESS	625	MG/L AS CaCO3	EPA 130.2 CLK
DISSOLVED SOLIDS	810	MG/L @180 C	EPA 140.1 JGT
SUSPENDED SOLIDS	<1	MG/L @103 C	EPA 140.2 JGT
POTASSIUM	4.4	MG/L	EPA 250.1 ML
SODIUM	50	MG/L	EPA 200.7 SR
CHLORIDE	35	MG/L	EPA 325.3 CLK
FLUORIDE	0.3	MG/L	USGS 14327 RW
SULFATE	200	MG/L	EPA 275.4 SMM
AMMONIA (AS N)	9.1	MG/L	EPA 350.1 RW
NO2+NO3 AS NO3-N	2.0	MG/L	EPA 350.2 JAG
CHEMICAL OXYGEN DEMD	14	MG/L	EPA 410.1 JAG
TOTAL ARSENIC	<0.01	MG/L	EPA 206.2 ML
TOTAL BARIUM	<0.05	MG/L	EPA 200.7 SR
TOTAL CADMIUM	<0.001	MG/L	EPA 210.2 DC
TOTAL CALCIUM	140	MG/L	EPA 200.7 SR
TOTAL CHROMIUM	<0.01	MG/L	EPA 210.2 LAF

PPM - Parts/Million
 PPB - Parts/Billion
 (- Less than

MG/L - Milligrams/Liter
 uG/L - Micrograms/Liter
) - Greater than

MG/KG - Milligrams/Kilogram
 uG/KG - Micrograms/Kilogram
 pCi/L - pic Curies/Liter

Date of Report
08/03/87

UNIVERSITY OF IOWA - RADIATION LABORATORY
Analytical Report for Sample Number 8757835

Page No.
03

TEST	CONCENTRATION	METHOD USED	ANALYSIS
TOTAL COPPER	<0.01 MG/L	EPA 220.1	ML
IRON	0.24 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	55 MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	ML
TOTAL SELENIUM	<0.01 MG/L	EPA 270.3	ML
TOTAL SILVER	<0.01 MG/L	EPA 272.1	ML
TOTAL ZINC	0.03 MG/L	EPA 200.7	SR

Verified: *MTF/LB*

PPM - Parts/Million
PPB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 1020

Client: Iowa DNR Attn: Steve Grigurich
Client Address: F.O. #5
Des Moines, Iowa 50319

Project Identification: Metro East SLF Private Well Sampling
Client Sample Identification: Vogelgar Deep Well
Date Sample Collected: 7/14/87
Date Sample Received: 7/15/87

ANALYTICAL RESULTS

UHL Lab No. 8257835

<u>ANALYTE</u>	<u>CONCENTRATION (ug/L)</u>	<u>QUANTITATION LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,2-DICHLOROETHANE	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
DI-BROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
p-DICHLOROBENZENE	<1	1
TRICHLOROETHENE	<1	1

Analytical Method: EPA Method 524

Analyst: N. Mattix
Verified: *[Signature]*
Date Reported: 07/30/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 0757837

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-3371

Date Received: 07/15/87

Date of Report: 08/03/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
 Date Collected: 07/14/87 10:40:00

Sample Description: WATER, SHALLOW WELL
 Client Reference:

Comments

BURDOCK FARM
 METRO EAST LANDFILL, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
pH VALUE (LAB)	7.3	pH UNITS	CLK
SPEC. CONDUCTANCE	2300	uMHOS @ 25 C	CLK
PHEN. ALKALINITY	NONE	MG/L AS CaCO3	CLK
TOTAL ALKALINITY	294	MG/L AS CaCO3	CLK
TOTAL HARDNESS	1210	MG/L AS CaCO3	CLK
DISSOLVED SOLIDS	1660	MG/L @180 C	JGT
SUSPENDED SOLIDS	<1	MG/L @103 C	JGT
POTASSIUM	0.5	MG/L	ML
SODIUM	22	MG/L	SR
CHLORIDE	160	MG/L	CLK
FLUORIDE	0.3	MG/L	RWW
SULFATE	330	MG/L	SMM
AMMONIA (AS N)	<0.1	MG/L	RWW
NO2+NO3 AS NO3-N	120	MG/L	JAG
CHEMICAL OXYGEN DMND	26	MG/L	JAG
TOTAL ARSENIC	<0.01	MG/L	ML
TOTAL BARIUM	0.08	MG/L	SR
TOTAL CADMIUM	<0.001	MG/L	DC
TOTAL CALCIUM	260	MG/L	SR
TOTAL CHROMIUM	<0.01	MG/L	LAF

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

Date of Report
08/25/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Page No.
02

Analytical Report for Sample Number 8757837

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	0.03 MG/L	EPA 220.1	ML
IRON	0.29 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	120 MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	ML
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01 MG/L	EPA 272.1	ML
TOTAL ZINC	0.39 MG/L	EPA 200.7	SR

Verified: *MPF/LG*

PPM - Parts/Million
PPB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pice Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 1020

Client: Iowa DNR Attn: Steve Grgurich
Client Address: F.O. #5
Des Moines, Iowa 50319

Project Identification: Metro East SLF Private Well Sampling
Client Sample Identification: Burdock Shallow Well
Date Sample Collected: 7/14/87
Date Sample Received: 7/15/87

ANALYTICAL RESULTS

UHL Lab No. B257837

ANALYTE	CONCENTRATION (ug/L)	QUANTITATION LIMIT (ug/L)
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,2-DICHLOROETHANE	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
p-DICHLOROBENZENE	<1	1
TRICHLOROETHENE	<1	1

Analytical Method: EPA Method 524

Analyst: *N. Mattix*
Verified: *DA*
Date Reported: 07/30/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8757836

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 07/15/87

Date of Report: 08/03/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
 Date Collected: 07/14/87 10:40:00

Sample Description: WATER, DEEP WELL
 Client Reference:

Comments

BURDOCK FARM
 METRO EAST LANDFILL, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION		METHOD USED	ANALYST
PH VALUE (LAB)	7.9	PH UNITS.	EPA 150.1	CLK
SPEC. CONDUCTANCE	1400	UMHOS @ 25 C	EPA 120.1	CLK
PHEN. ALKALINITY	NONE	MG/L AS CaCO3	EPA 310.1	CLK
TOTAL ALKALINITY	447	MG/L AS CaCO3	EPA 310.1	CLK
TOTAL HARDNESS	466	MG/L AS CaCO3	EPA 130.2	CLK
DISSOLVED SOLIDS	850	MG/L @180 C	EPA 160.1	JGT
SUSPENDED SOLIDS	3	MG/L @105 C	EPA 160.2	JGT
POTASSIUM	9.6	MG/L	EPA 258.1	ML
SODIUM	120	MG/L	EPA 200.7	SR
CHLORIDE	4.0	MG/L	EPA 325.3	CLK
FLUORIDE	0.5	MG/L	USGS 14327	RW
SULFATE	340	MG/L	EPA 275.4	SMM
AMMONIA (AS N)	13	MG/L	EPA 350.1	RW
NO2+NO3 AS NO3-N	<0.1	MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMD	18	MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01	MG/L	EPA 206.2	ML
TOTAL BARIUM	<0.05	MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001	MG/L	EPA 213.2	DC
TOTAL CALCIUM	88	MG/L	EPA 200.7	SR
TOTAL CHROMIUM	<0.01	MG/L	EPA 218.2	DC

PPM - Parts/Million
 PPB - Parts/Billion
 (- Less than

MG/L - Milligrams/Liter
 UG/L - Micrograms/Liter
) - Greater than

MG/KG - Milligrams/Kilogram
 UG/KG - Micrograms/Kilogram
 pCi/L - picocuries/Liter

Date of Report
08/03/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8757836

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYSIS
TOTAL COPPER	<0.01 MG/L	EPA 230.1	ML
IRON	2.3 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	59 MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.04 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	ML
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01 MG/L	EPA 272.1	ML
TOTAL ZINC	<0.02 MG/L	EPA 200.7	SR

Verified: MTF/LG

PPM - Parts/Million MG/L - Milligrams/Liter MC/KG - Milligrams/Kilogram
PPB - Parts/Billion µG/L - Micrograms/Liter µG/KG - Micrograms/Kilogram
< - Less than > - Greater than pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 1020

Client: Iowa DNR Attn: Steve Grgurich
Client Address: F.O. #5
Des Moines, Iowa 50319

Project Identification: Metro East SLF Private Well Sampling
Client Sample Identification: Burdock Deep Well
Date Sample Collected: 7/14/87
Date Sample Received: 7/15/87

ANALYTICAL RESULTS

UHL Lab No. 8797836

ANALYTE	CONCENTRATION (ug/L)	QUANTITATION LIMIT (ug/L)
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CHLOROFORM	1	1
1,2-DICHLOROETHANE	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
p-DICHLOROBENZENE	<1	1
TRICHLOROETHENE	<1	1

Analytical Method: EPA Method 524

Analyst: N. Mattix
Verified: 
Date Reported: 07/30/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8757842

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 07/15/87

Date of Report: 08/03/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
 Date Collected: 07/14/87 01:45:00

Sample Description: WATER, SHALLOW WELL
 Client Reference:

Comments

HIBES RES.
 METRO EAST LANDFILL, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
pH VALUE (LAB)	7.6 pH UNITS	EPA 150.1	CLK
SPEC. CONDUCTANCE	760 μ MHOS @ 25 C	EPA 120.1	CLK
PHEN. ALKALINITY	NONE MG/L AS CaCO3	EPA 310.1	CLK
TOTAL ALKALINITY	360 MG/L AS CaCO3	EPA 310.1	CLK
TOTAL HARDNESS	372 MG/L AS CaCO3	EPA 130.2	CLK
DISSOLVED SOLIDS	100 MG/L @180 C	EPA 140.1	JGT
SUSPENDED SOLIDS	4 MG/L @103 C	EPA 140.2	JGT
POTASSIUM	<0.1 MG/L	EPA 258.1	ML
SODIUM	8.0 MG/L	EPA 200.7	SR
CHLORIDE	14 MG/L	EPA 325.3	CLK
FLUORIDE	0.4 MG/L	USGS 14327	RWW
SULFATE	41 MG/L	EPA 275.4	SMM
AMMONIA (AS N)	<0.1 MG/L	EPA 350.1	RWW
NO2+NO3 AS NO3-N	<0.1 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMD	14 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	ML
TOTAL BARIUM	0.21 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CALCIUM	94 MG/L	EPA 200.7	SR
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion μ G/L - Micrograms/Liter μ G/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pico Curies/Liter

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	<0.01 MG/L	EPA 230.1	NL
IRON	2.7 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	37 MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.63 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 145.1	NL
TOTAL SELENIUM	<0.01 MG/L	EPA 140.2	NL
TOTAL SILVER	<0.01 MG/L	EPA 272.1	NL
TOTAL ZINC	0.64 MG/L	EPA 200.7	SR

Verified: MTF/LG

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
PBB - Parts/Billion µG/L - Micrograms/Liter µG/KG - Micrograms/Kilogram
< - Less than > - Greater than pCi/L - pico/Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 1020

Client: Iowa DNR Attn: Steve Grgurich
Client Address: F.O. #5
Des Moines, Iowa 50319

Project Identification: Metro East SLF Private Well Sampling
Client Sample Identification: Hibbs Well
Date Sample Collected: 7/14/87
Date Sample Received: 7/15/87

ANALYTICAL RESULTS

UHL Lab No. 8252842

ANALYTE	CONCENTRATION (ug/L)	QUANTITATION LIMIT (ug/L)
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,2-DICHLOROETHANE	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
p-DICHLOROBENZENE	<1	1
TRICHLOROETHENE	<1	1

Analytical Method: EPA Method 524

Analyst: N. Mattix
Verified: *[Signature]*
Date Reported: 07/30/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8757845

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 07/15/87

Date of Report: 08/03/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUNNELLS
 Date Collected: 07/14/87 02:15:00

Sample Description: WATER, DEEP WELL
 Client Reference:

Comments

DANKS FARM
 METRO EAST LANDFILL, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
pH VALUE (LAB)	7.6	pH UNITS	EPA 150.1 CLK
SPEC. CONDUCTANCE	4200	uMHOS @ 25 C	EPA 120.1 CLK
PHEN. ALKALINITY	NONE	MG/L AS CaCO3	EPA 310.1 CLK
TOTAL ALKALINITY	258	MG/L AS CaCO3	EPA 310.1 CLK
TOTAL HARDNESS	1320	MG/L AS CaCO3	EPA 130.2 CLK
DISSOLVED SOLIDS	3400	MG/L @180 C	EPA 160.1 JGT
SUSPENDED SOLIDS	26	MG/L @103 C	EPA 160.2 JGT
POTASSIUM	11	MG/L	EPA 258.1 ML
SODIUM	580	MG/L	EPA 200.7 SR
CHLORIDE	50	MG/L	EPA 325.3 CLK
FLUORIDE	2.2	MG/L	USGS 14327 RWW
SULFATE	2000	MG/L	EPA 275.4 SMM
AMMONIA (AS N)	2.2	MG/L	EPA 350.1 RWW
NO2+NO3 AS NO3-N	<0.1	MG/L	EPA 353.2 JAG
CHEMICAL OXYGEN DMND	14	MG/L	EPA 410.1 JAG
TOTAL ARSENIC	<0.01	MG/L	EPA 206.2 ML
TOTAL BARIUM	<0.05	MG/L	EPA 200.7 SR
TOTAL CADMIUM	<0.001	MG/L	EPA 213.2 DC
TOTAL CALCIUM	320	MG/L	EPA 200.7 SR
TOTAL CHROMIUM	<0.01	MG/L	EPA 218.2 LAF

PPM - Parts/Million MG/L - Milligrams/Liter MC/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pico Curies/Liter

Date of Report
08/03/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 0757845

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	<0.01 MG/L	EPA 220.1	ML
IRON	16 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	110 MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.16 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	ML
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01 MG/L	EPA 272.	ML
TOTAL ZINC	0.03 MG/L	EPA 200.7	SR

Verified: MTF/LG

PPM - Parts/Million
PPB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 1020

Client: Iowa DNR Attn: Steve Grgurich
Client Address: F.O. #5
Des Moines, Iowa 50319

Project Identification: Metro East SLF Private Well Sampling
Client Sample Identification: Danks Deep Well
Date Sample Collected: 7/14/87
Date Sample Received: 7/15/87

ANALYTICAL RESULTS

UHL Lab No. 8757845

<u>ANALYTE</u>	<u>CONCENTRATION</u> <u>(ug/L)</u>	<u>QUANTITATION</u> <u>LIMIT (ug/L)</u>
<u>VINYL CHLORIDE</u>	<u><1</u>	<u>1</u>
<u>1,1-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CHLOROFORM</u>	<u><1</u>	<u>1</u>
<u>1,2-DICHLOROETHANE</u>	<u><1</u>	<u>1</u>
<u>1,1,1-TRICHLOROETHANE</u>	<u><1</u>	<u>1</u>
<u>CARBON TETRACHLORIDE</u>	<u><1</u>	<u>1</u>
<u>BROMODICHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>DIBROMOCHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>BENZENE</u>	<u><1</u>	<u>1</u>
<u>BROMOFORM</u>	<u><1</u>	<u>1</u>
<u>p-DICHLOROBENZENE</u>	<u><1</u>	<u>1</u>
<u>TRICHLOROETHENE</u>	<u><1</u>	<u>1</u>

Analytical Method: EPA Method 524

Analyst: N. Mattix
Verified: 
Date Reported: 07/30/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8757843

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 07/15/87

Date of Report: 08/03/87

Submitter: EPD 3
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUMNELLS
 Date Collected: 07/14/87 02:15:00

Sample Description: WATER, PASTURE WELL
 Client Reference:

Comments

DANKS RES. SHALLOW PASTURE WELL
 METRO EAST LANDFILL WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
pH VALUE (LAB)	7.45	pH UNITS	CLK
SPEC. CONDUCTANCE	410	µMHOS @ 25 C	CLK
PHEN. ALKALINITY	NONE	MG/L AS CaCO3	CLK
TOTAL ALKALINITY	177	MG/L AS CaCO3	CLK
TOTAL HARDNESS	196	MG/L AS CaCO3	CLK
DISSOLVED SOLIDS	200	MG/L @180 C	JGT
SUSPENDED SOLIDS	<1	MG/L @103 C	JGT
POTASSIUM	3.5	MG/L	ML
SODIUM	8.2	MG/L	SR
CHLORIDE	3.5	MG/L	CLK
FLUORIDE	0.35	MG/L	RWW
SULFATE	30	MG/L	SMM
AMMONIA (AS N)	0.2	MG/L	RWW
NO2+NO3 AS NO3-N	0.2	MG/L	JAC
CHEMICAL OXYGEN DEMD	4	MG/L	JAC
TOTAL ARSENIC	<0.01	MG/L	ML
TOTAL BARIUM	0.05	MG/L	SR
TOTAL CADMIUM	<0.001	MG/L	DC
TOTAL CALCIUM	51	MG/L	SR
TOTAL CHROMIUM	<0.01	MG/L	DC

PPM - Parts/Million
 PFB - Parts/Billion
 < - Less than

MG/L - Milligrams/Liter
 µG/L - Micrograms/Liter
 > - Greater than

MG/KG - Milligrams/Kilogram
 µG/KG - Micrograms/Kilogram
 pCi/L - pico Curies/Liter

Date of Report
08/03/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY
Analytical Report for Sample Number 8757843

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	<0.01 MG/L	EPA 220.1	ML
IRON	0.26 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	14 MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.22 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	ML
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01 MG/L	EPA 272.1	ML
TOTAL ZINC	0.06 MG/L	EPA 200.7	SR

Verified: MTF/LG

PPM - Parts/Million
PPM - Parts/Million
(- Less than

MG/L - Milligrams/Liter
uG/L - Micrograms/Liter
) - Greater than

MG/KG - Milligrams/Kilogram
uG/KG - Micrograms/Kilogram
pCi/L - picocuries/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 1020

Client: Iowa DNR Attn: Steve Grgurich
Client Address: F.O. #5
Des Moines, Iowa 50319

Project Identification: Metro East SLF Private Well Sampling
Client Sample Identification: Danks Pasture Shallow Well
Date Sample Collected: 7/14/87
Date Sample Received: 7/15/87

ANALYTICAL RESULTS

UHL Lab No. 8752843

ANALYTE	CONCENTRATION (ug/L)	QUANTITATION LIMIT (ug/L)
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,2-DICHLOROETHANE	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
p-DICHLOROBENZENE	<1	1
TRICHLOROETHENE	<1	1

Analytical Method: EPA Method 524

Analyst: N. Mattix
Verified: *NM*
Date Reported: 07/30/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8757844

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 07/15/87

Date of Report: 08/03/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUNNELLS
 Date Collected: 07/14/87 02:15:00

Sample Description: WATER, SHALLOW
 Client Reference:

Comments

DANKS RES. SHALLOW BARNYARD WELL
 METRO EAST LANDFILL, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
pH VALUE (LAB)	7.3 pH UNITS	EPA 150.1	CLK
SPEC. CONDUCTANCE	1000 uMHOS @ 25 C	EPA 120.1	CLK
PHEN. ALKALINITY	NONE MG/L AS CaCO3	EPA 310.1	CLK
TOTAL ALKALINITY	306 MG/L AS CaCO3	EPA 310.1	CLK
TOTAL HARDNESS	518 MG/L AS CaCO3	EPA 130.2	CLK
DISSOLVED SOLIDS	580 MG/L @180 C	EPA 160.1	JGT
SUSPENDED SOLIDS	<1 MG/L @103 C	EPA 160.2	JGT
POTASSIUM	2.6 MG/L	EPA 258.1	ML
SODIUM	18 MG/L	EPA 200.7	SR
CHLORIDE	44 MG/L	EPA 325.3	CLK
FLUORIDE	0.3 MG/L	USGS 14327	RWW
SULFATE	150 MG/L	EPA 275.4	SMM
AMMONIA (AS N)	<0.1 MG/L	EPA 350.1	RWW
NO2+NO3 AS NO3-N	9.4 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DMND	18 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	ML
TOTAL BARIUM	0.08 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CALCIUM	110 MG/L	EPA 200.7	SR
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	LAF

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pico Curies/Liter

Date of Report
08/03/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8737844

Page No.
02

TEST	CONCENTRATION		METHOD USED	ANALYST
TOTAL COPPER	<0.01	MG/L	EPA 220.1	ML
IRON	0.14	MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01	MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	50	MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02	MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001	MG/L	EPA 245.1	ML
TOTAL SELENIUM	<0.01	MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01	MG/L	EPA 272.1	ML
TOTAL ZINC	0.04	MG/L	EPA 200.7	SR

Verified: MTF/LG

PPM - Parts/Million
PPB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pice Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 1020

Client: Iowa DNR Attn: Steve Grgurich
Client Address: F.O. #5
Des Moines, Iowa 50319

Project Identification: Metro East SLF Private Well Sampling
Client Sample Identification: Danks Barnyard Well Shallow
Date Sample Collected: 7/14/87
Date Sample Received: 7/15/87

ANALYTICAL RESULTS

UHL Lab No. 8757844

ANALYTE	CONCENTRATION ($\mu\text{g/L}$)	QUANTITATION LIMIT ($\mu\text{g/L}$)
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,2-DICHLOROETHANE	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
p-DICHLOROBENZENE	<1	1
TRICHLOROETHENE	<1	1

Analytical Method: EPA Method 524

Analyst: N. Mattix
Verified: *[Signature]*
Date Reported: 07/30/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8737881

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Bldg
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 07/15/87

Date of Report: 08/03/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUNNELLS
 Date Collected: 07/15/87 10:00:00

Sample Description: WATER, SHALLOW WELL
 Client Reference:

Comments

JERRY KAHE RES.
 METRO EAST LANDFILL, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
pH VALUE (LAB)	7.4 pH UNITS	EPA 150.1	CLK
SPEC. CONDUCTANCE	600 µMHOS @ 25 C	EPA 120.1	CLK
PHEN. ALKALINITY	NONE MG/L AS CaCO ₃	EPA 310.1	CLK
TOTAL ALKALINITY	240 MG/L AS CaCO ₃	EPA 310.1	CLK
TOTAL HARDNESS	298 MG/L AS CaCO ₃	EPA 130.2	CLK
DISSOLVED SOLIDS	320 MG/L @180 C	EPA 140.1	JGT
SUSPENDED SOLIDS	<1 MG/L @103 C	EPA 140.2	JGT
POTASSIUM	2.3 MG/L	EPA 258.1	ML
SODIUM	14 MG/L	EPA 200.7	SR
CHLORIDE	13 MG/L	EPA 325.3	CLK
FLUORIDE	0.5 MG/L	USCS 14327	RWW
SULFATE	46 MG/L	EPA 275.4	SMM
AMMONIA (AS N)	<0.1 MG/L	EPA 350.1	RWW
NO ₂ +NO ₃ AS NO ₃ -N	<0.1 MG/L	EPA 353.2	JAG
CHEMICAL OXYGEN DEMND	13 MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	ML
TOTAL BARIUM	<0.05 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CALCIUM	76 MG/L	EPA 200.7	SR
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC

PPM - Parts/Million
 PPB - Parts/Billion
 < - Less than

MG/L - Milligrams/Liter
 µG/L - Micrograms/Liter
 > - Greater than

MG/KG - Milligrams/Kilogram
 µG/KG - Micrograms/Kilogram
 pCi/L - pico Curies/Liter

Date of Report
08/03/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Page No.
02

Analytical Report for Sample Number 8757881

TEST	CONCENTRATION	METHOD USED	ANALYSIS
TOTAL COPPER	<0.01 MG/L	EPA 220.1	ML
IRON	0.60 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	21 MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.04 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	DC
TOTAL SELENIUM	<0.01 MG/L	EPA 270.3	ML
TOTAL SILVER	<0.01 MG/L	EPA 272.1	ML
TOTAL ZINC	0.04 MG/L	EPA 200.7	SR

Verified: MTF/LB

PPM - Parts/Million
PPB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 1020

Client: Iowa DNR Attn: Steve Grgurich
Client Address: F.O. #5
Des Moines, Iowa 50319

Project Identification: Metro East SLF Private Well Sampling
Client Sample Identification: Jerry Kane shallow well
Date Sample Collected: 7/15/87
Date Sample Received: 7/15/87

ANALYTICAL RESULTS

UHL Lab No. 8757881

<u>ANALYTE</u>	<u>CONCENTRATION</u> <u>(ug/L)</u>	<u>QUANTITATION</u> <u>LIMIT (ug/L)</u>
<u>VINYL CHLORIDE</u>	<u><1</u>	<u>1</u>
<u>1,1-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CHLOROFORM</u>	<u><1</u>	<u>1</u>
<u>1,2-DICHLOROETHANE</u>	<u><1</u>	<u>1</u>
<u>1,1,1-TRICHLOROETHANE</u>	<u><1</u>	<u>1</u>
<u>CARBON TETRACHLORIDE</u>	<u><1</u>	<u>1</u>
<u>BROMOCHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>DIBROMOCHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>BENZENE</u>	<u><1</u>	<u>1</u>
<u>BROMOFORM</u>	<u><1</u>	<u>1</u>
<u>p-DICHLOROBENZENE</u>	<u><1</u>	<u>1</u>
<u>TRICHLOROETHENE</u>	<u><1</u>	<u>1</u>

Analytical Method: EPA Method 524

Analyst: N. Mattix
Verified: 
Date Reported: 07/31/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8757882

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 07/15/87

Date of Report: 08/03/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUNNELLS
 Date Collected: 07/15/87 10:15:00

Sample Description: WATER, SHALLOW WELL
 Client Reference:

Comments

LYLE CULLING FARM
 METRO EAST LANDFILL, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
pH VALUE (LAB)	7.3	pH UNITS	CLK
SPEC. CONDUCTANCE	750	uMHOS @ 25 C	CLK
PHEN. ALKALINITY	NONE	MG/L AS CaCO3	CLK
TOTAL ALKALINITY	231	MG/L AS CaCO3	CLK
TOTAL HARDNESS	354	MG/L AS CaCO3	CLK
DISSOLVED SOLIDS	400	MG/L @180 C	JGT
SUSPENDED SOLIDS	<1	MG/L @103 C	JGT
POTASSIUM	0.3	MG/L	MI
SODIUM	12	MG/L	CLK
CHLORIDE	27	MG/L	CLK
FLUORIDE	0.4	MG/L	RWW
SULFATE	84	MG/L	BMM
AMMONIA (AS N)	<0.1	MG/L	RWW
NO2+NO3 AS NO3-N	15	MG/L	JAG
CHEMICAL OXYGEN DEMD	4	MG/L	JAG
TOTAL ARSENIC	<0.01	MG/L	ML
TOTAL BARIUM	0.08	MG/L	SR
TOTAL CADMIUM	<0.001	MG/L	DC
TOTAL CALCIUM	110	MG/L	SR
TOTAL CHROMIUM	<0.01	MG/L	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPS - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pice Curies/Liter

Date of Report
08/02/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Page No.
02

Analytical Report for Sample Number 8757682

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	<0.01 MG/L	EPA 220.1	ML
IRON	0.03 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	20 MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	DC
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01 MG/L	EPA 272.1	ML
TOTAL ZINC	0.54 MG/L	EPA 200.7	SR

Verified: MTF/LG

PPM - Parts/Million
PPB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico, Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 1020

Client: Iowa DNR Attn: Steve Grgrich
Client Address: F.O. #5
Des Moines, Iowa 50319

Project Identification: Metro East SLF Private Well Sampling
Client Sample Identification: Lyle Gulling Farm shallow well
Date Sample Collected: 7/15/87
Date Sample Received: 7/15/87

ANALYTICAL RESULTS

UHL Lab No. 8257882

ANALYTE	CONCENTRATION (ug/L)	QUANTITATION LIMIT (ug/L)
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,2-DICHLOROETHANE	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
p-DICHLOROBENZENE	<1	1
TRICHLOROETHENE	<1	1

Analytical Method: EPA Method 524

Analyst: N. Mattix
Verified: 
Date Reported: 07/31/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8757883

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 07/15/87

Date of Report: 08/03/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUNNELLS
 Date Collected: 07/15/87 10:30:00

Sample Description: WATER, SHALLOW WELL
 Client Reference:

Comments

SLOAN FARM
 METRO EAST LANDFILL, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
pH VALUE (LAB)	6.8	pH UNITS	EPA 150.1
SPEC. CONDUCTANCE	410	µMHOS @ 25 C	EPA 120.1
PHEN. ALKALINITY	NONE	MG/L AS CaCO3	EPA 310.1
TOTAL ALKALINITY	93	MG/L AS CaCO3	EPA 310.1
TOTAL HARDNESS	174	MG/L AS CaCO3	EPA 130.2
DISSOLVED SOLIDS	220	MG/L @180 C	EPA 160.1
SUSPENDED SOLIDS	3	MG/L @103 C	EPA 160.2
POTASSIUM	<0.1	MG/L	EPA 258.1
SODIUM	9.6	MG/L	EPA 200.7
CHLORIDE	24	MG/L	EPA 325.3
FLUORIDE	0.15	MG/L	USGS 14327
SULFATE	46	MG/L	EPA 275.4
AMMONIA (AS N)	<0.1	MG/L	EPA 350.1
NO2+NO3 AS NO3-N	6.1	MG/L	EPA-353.2
CHEMICAL OXYGEN DMND	9	MG/L	EPA 410.1
TOTAL ARSENIC	<0.01	MG/L	EPA 206.2
TOTAL BARIUM	0.14	MG/L	EPA 200.7
TOTAL CADMIUM	<0.001	MG/L	EPA 213.2
TOTAL CALCIUM	35	MG/L	EPA 200.7
TOTAL CHROMIUM	<0.01	MG/L	EPA 218.2

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion µG/L - Micrograms/Liter µG/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pico/Curies/Liter

TEST	CONCENTRATION	METHOD USED	ANALY
TOTAL COPPER	<0.01 MG/L	EPA 220.1	ML
IRON	0.18 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	15 MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	DC
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01 MG/L	EPA 272.1	ML
TOTAL ZINC	0.10 MG/L	EPA 200.7	SR

Verified: MTF/LG

PPM - Parts/Million
PPB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 1020

Client: Iowa DNR Attn: Steve Grgurich
Client Address: F.O. #5
Des Moines, Iowa 50319

Project Identification: Metro East SLF Private Well Sampling
Client Sample Identification: Sloan shallow well
Date Sample Collected: 7/15/87
Date Sample Received: 7/15/87

ANALYTICAL RESULTS

UHL Lab No. 8757983

ANALYTE	CONCENTRATION (ug/L)	QUANTITATION LIMIT (ug/L)
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,2-DICHLOROETHANE	<1	1
1,1,1-TRICHLOROETHANE	1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
p-DICHLOROBENZENE	<1	1
TRICHLOROETHENE	<1	1

Analytical Method: EPA Method 524

Analyst: N. Mattix
Verified: 
Date Reported: 07/31/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8757884

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 07/15/87

Date of Report: 08/03/87

Submitter: EFD S
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUMKELLS
 Date Collected: 07/15/87 10:30:00

Sample Description: WATER, SHALLOW WELL
 Client Reference:

Comments

SLOAN FARM DUPLICATE
 METRO EAST LANDFILL, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
pH VALUE (LAB)	6.85	pH UNITS	CLX
SPEC. CONDUCTANCE	420	uMHOS @ 25 C	CLX
PHEN. ALKALINITY	NONE	MG/L AS CaCO3	CLX
TOTAL ALKALINITY	107	MG/L AS CaCO3	CLX
TOTAL HARDNESS	178	MG/L AS CaCO3	CLX
DISSOLVED SOLIDS	250	MG/L @180 C	JGT
SUSPENDED SOLIDS	3	MG/L @103 C	JGT
POTASSIUM	<0.1	MG/L	ML
SODIUM	7.8	MG/L	SR
CHLORIDE	25	MG/L	CLX
FLUORIDE	0.15	MG/L	RWW
SULFATE	44	MG/L	SMM
AMMONIA (AS N)	<0.1	MG/L	RWW
NO2+NO3 AS NO3-N	6.0	MG/L	JAC
CHEMICAL OXYGEN DEMD	9	MG/L	JAC
TOTAL ARSENIC	<0.01	MG/L	ML
TOTAL BARIUM	0.15	MG/L	SR
TOTAL CADMIUM	<0.001	MG/L	DC
TOTAL CALCIUM	36	MG/L	SR
TOTAL CHROMIUM	<0.01	MG/L	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPS - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

Date of Report
08/03/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY
Analytical Report for Sample Number 8757884

Page No.
02

TEST	CONCENTRATION		METHOD USED	ANALYSIS
TOTAL COPPER	<0.01	MG/L	EPA220.1	ML
IRON	0.21	MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01	MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	15	MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02	MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001	MG/L	EPA 245.1	DC
TOTAL SELENIUM	<0.01	MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01	MG/L	EPA 272.1	ML
TOTAL ZINC	0.12	MG/L	EPA 200.7	SR

Verified: MTF/LG

PPM - Parts/Million
PPB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Microgram/Kilogram
pCi/L - picocuries/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 1020

Client: Iowa DNR Attn: Steve Grgurich
Client Address: F.O. #5
Des Moines, Iowa 50319

Project Identification: Metro East SLF Private Well Sampling
Client Sample Identification: Sloan shallow well (duplicate)
Date Sample Collected: 7/15/87
Date Sample Received: 7/15/87

ANALYTICAL RESULTS

UHL Lab No. 8752884

ANALYTE	CONCENTRATION (ug/L)	QUANTITATION LIMIT (ug/L)
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,2-DICHLOROETHANE	<1	1
1,1,1-TRICHLOROETHANE	1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
p-DICHLOROBENZENE	<1	1
TRICHLOROETHENE	<1	1

Analytical Method: EPA Method 524

Analyst: N. Mattix
Verified: 
Date Reported: 07/31/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8757884

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4506

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-3371

Date Received: 07/15/87

Date of Report: 08/03/87

Submitter: EPD 3
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUNNELLS
 Date Collected: 07/15/87 10:40:00

Sample Description: WATER, PASTURE
 Client Reference:

Comments

BLANCH CULLING FARM, PASTURE SHALLOW
 METRO EAST LANDFILL, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
pH VALUE (LAB)	7.6	pH UNITS	EPA 150.1 CLK
SPEC. CONDUCTANCE	880	UMHOS @ 25 C	EPA 120.1 CLK
PHEN. ALKALINITY	NONE	MG/L AS CaCO3	EPA 310.1 CLK
TOTAL ALKALINITY	226	MG/L AS CaCO3	EPA 310.1 CLK
TOTAL HARDNESS	427	MG/L AS CaCO3	EPA 130.2 CLK
DISSOLVED SOLIDS	490	MG/L @180 C	EPA 160.1 JGT
SUSPENDED SOLIDS	5	MG/L @103 C	EPA 160.2 JGT
POTASSIUM	2.1	MG/L	EPA 258.1 ML
SODIUM	15	MG/L	EPA 200.7 SR
CHLORIDE	48	MG/L	EPA 325.3 CLK
FLUORIDE	0.25	MG/L	USGS 14327 RW
SULFATE	71	MG/L	EPA 275.4 SMM
AMMONIA (AS N)	<0.1	MG/L	EPA 350.1 RW
NO2+NO3 AS NO3-N	23	MG/L	EPA 353.2 JAG
CHEMICAL OXYGEN DMND	22	MG/L	EPA 410.1 JAG
TOTAL ARSENIC	<0.01	MG/L	EPA 206.2 ML
TOTAL BARIUM	0.10	MG/L	EPA 200.7 SR
TOTAL CADMIUM	<0.001	MG/L	EPA 213.2 DC
TOTAL CALCIUM	89	MG/L	EPA 200.7 SR
TOTAL CHROMIUM	<0.01	MG/L	EPA 218.2 LAF

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion UG/L - Micrograms/Liter UG/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pico Curies/Liter

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	<0.01 MG/L	EPA 220.1	ML
IRON	0.23 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	43 MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 243.1	DC
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01 MG/L	EPA 272.1	ML
TOTAL ZINC	0.23 MG/L	EPA 200.7	SR

Verified: MTF/LG

PPM - Parts/Million
PPB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
uG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
uG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 1020

Client: Iowa DNR Attn: Steve Grgurich
Client Address: F.O. #5
Des Moines, Iowa 50319

Project Identification: Metro East SLF Private Well Sampling
Client Sample Identification: Blanch Gulling shallow pasture

Date Sample Collected: 7/1st 87
Date Sample Received: 7/1st 87

ANALYTICAL RESULTS

UHL Lab No. 8252886

ANALYTE	CONCENTRATION (ug/L)	QUANTITATION LIMIT (ug/L)
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,2-DICHLOROETHANE	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
p-DICHLOROBENZENE	<1	1
TRICHLOROETHENE	<1	1

Analytical Method: EPA Method 524

Analyst: N. Mattix
Verified: *[Signature]*
Date Reported: 07/31/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8757885

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 07/15/87

Date of Report: 08/03/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUNNELLS
 Date Collected: 07/15/87 10:40:00

Sample Description: WATER, SHALLOW HOUSE
 Client Reference:

Comments

BLANCH GULLING RES.
 METRO EAST LANDFILL, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYSIS
pH VALUE (LAB)	7.2	pH UNITS	EPA 150.1 CLK
SPEC. CONDUCTANCE	520	uMHOS @ 25 C	EPA 120.1 CLK
PHEN. ALKALINITY	NONE	MG/L AS CaCO3	EPA 310.1 CLK
TOTAL ALKALINITY	179	MG/L AS CaCO3	EPA 310.1 CLK
TOTAL HARDNESS	240	MG/L AS CaCO3	EPA 130.2 CLK
DISSOLVED SOLIDS	280	MG/L @180 C	EPA 160.1 JGT
SUSPENDED SOLIDS	<1	MG/L @103 C	EPA 160.2 JGT
POTASSIUM	<0.1	MG/L	EPA 258.1 ML
SODIUM	8.4	MG/L	EPA 200.7 SR
CHLORIDE	8.0	MG/L	EPA 325.3 CLK
FLUORIDE	0.25	MG/L	USGS 14327 RWW
SULFATE	50	MG/L	EPA 275.4 SMM
AMMONIA (AS N)	10.1	MG/L	EPA 350.1 RWW
NO2+NO3 AS NO3-N	7.3	MG/L	EPA 353.2 JAG
CHEMICAL OXYGEN DEMD	9	MG/L	EPA 410.1 JAG
TOTAL ARSENIC	<0.01	MG/L	EPA 206.2 ML
TOTAL BARIUM	0.12	MG/L	EPA 200.7 SR
TOTAL CADMIUM	<0.001	MG/L	EPA 213.2 DC
TOTAL CALCIUM	49	MG/L	EPA 200.7 SR
TOTAL CHROMIUM	<0.01	MG/L	EPA 218.2 DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - picocuries/Liter

Date of Report
08/03/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Page No.
02

Analytical Report for Sample Number 8757885

TEST	CONCENTRATION		METHOD USED	ANALYSIS
TOTAL COPPER	0.09	MG/L	EPA 220.1	ML
IRON	0.02	MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01	MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	24	MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02	MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001	MG/L	EPA 245.1	DC
TOTAL SELENIUM	<0.01	MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01	MG/L	EPA 272.1	ML
TOTAL ZINC	1.7	MG/L	EPA 200.7	SR

Verified: DTF/LG

PPM - Parts/Million
PPB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pice Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 1020

Client: Iowa DNR Attn: Steve Grgurich
Client Address: F.O. #5
Des Moines, Iowa 50319

Project Identification: Metro East SLF Private Well Sampling
Client Sample Identification: Blanch Gulling shallow house well

Date Sample Collected: 7/15/87
Date Sample Received: 7/15/87

ANALYTICAL RESULTS

UHL Lab No. 8252985

ANALYTE	CONCENTRATION (ug/L)	QUANTITATION LIMIT (ug/L)
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,2-DICHLOROETHANE	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
p-DICHLOROBENZENE	<1	1
TRICHLOROETHENE	<1	1

Analytical Method: EPA Method 524

Analyst: N. Mattix
Verified: 
Date Reported: 07/31/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8757887

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Bldg
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 07/15/87

Date of Report: 08/03/87

Submitter: EPD 3
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUNNELLS
 Date Collected: 07/15/87 10:45:00

Sample Description: WATER, SHALLOW WELL
 Client Reference:

Comments

ADKINS RES.
 METRO EAST LANDFILL, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYS
pH VALUE (LAB)	7.45	pH UNITS	CLK
SPEC. CONDUCTANCE	560	uMHOS @ 25 C	CLK
PHEN. ALKALINITY	NONE	MG/L AS CaCO3	CLK
TOTAL ALKALINITY	162	MG/L AS CaCO3	CLK
TOTAL HARDNESS	268	MG/L AS CaCO3	CLK
DISSOLVED SOLIDS	300	MG/L @180 C	JGT
SUSPENDED SOLIDS	<1	MG/L @103 C	JGT
POTASSIUM	<0.1	MG/L	ML
SODIUM	6.2	MG/L	SR
CHLORIDE	16	MG/L	CLK
FLUORIDE	0.25	MG/L	RWW
SULFATE	22	MG/L	SMM
AMMONIA (AS N)	<0.1	MG/L	RWW
NO2+NO3 AS NO3-N	18	MG/L	JAG
CHEMICAL OXYGEN DMND	<1	MG/L	JAG
TOTAL ARSENIC	<0.01	MG/L	ML
TOTAL BARIUM	0.13	MG/L	SR
TOTAL CADMIUM	<0.001	MG/L	DC
TOTAL CALCIUM	61	MG/L	SR
TOTAL CHROMIUM	<0.01	MG/L	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pico Curies/Liter

TEST	CONCENTRATION	METHOD USED	ANALY
TOTAL COPPER	<0.01 MG/L	EPA 220.1	ML
IRON	<0.02 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	24 MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	DC
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01 MG/L	EPA 272.1	ML
TOTAL ZINC	0.02 MG/L	EPA 200.7	SR

Verified: MTF/LG

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
< - Less than > - Greater than pCi/L - picocuries/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 1020

Client: Iowa DNR Attn: Steve Grgurich
Client Address: F.O. #5
Des Moines, Iowa 50319

Project Identification: Metro East SLF Private Well Sampling
Client Sample Identification: Adkins shallow well

Date Sample Collected: 7/15/87
Date Sample Received: 7/15/87

ANALYTICAL RESULTS

UHL Lab No. 8757887

<u>ANALYTE</u>	<u>CONCENTRATION (ug/L)</u>	<u>QUANTITATION LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,2-DICHLOROETHANE	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
p-DICHLOROBENZENE	<1	1
TRICHLOROETHENE	<1	1

Analytical Method: EPA Method 524

Analyst: N. Mattix
Verified: 
Date Reported: 07/31/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8757831

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 07/15/87

Date of Report: 08/03/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUNNELLS
 Date Collected: 07/14/87 09:30:00

Sample Description: WATER, DEEP WELL
 Client Reference:

Comments

GAASS RES.
 METRO EAST LANDFILL, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
pH VALUE (LAB)	7.6	pH UNITS	CLK/
SPEC. CONDUCTANCE	1800	uMHOS @ 25 C	CLK
PHEN. ALKALINITY	NONE	MG/L AS CaCO3	CLK
TOTAL ALKALINITY	383	MG/L AS CaCO3	CLK
TOTAL HARDNESS	584	MG/L AS CaCO3	CLK/
DISSOLVED SOLIDS	1180	MG/L @180 C	JGT
SUSPENDED SOLIDS	2	MG/L @100 C	JGT
POTASSIUM	11	MG/L	ML
SODIUM	180	MG/L	SR
CHLORIDE	3.5	MG/L	CLK/
FLUORIDE	0.8	MG/L	RWW
SULFATE	640	MG/L	SMM
AMMONIA (AS N)	4.6	MG/L	RWW
NO2+NO3 AS NO3-N	0.8	MG/L	JAG
CHEMICAL OXYGEN DMND	14	MG/L	JAG
TOTAL ARSENIC	<0.01	MG/L	ML
TOTAL BARIUM	<0.05	MG/L	SR
TOTAL CADMIUM	<0.001	MG/L	DC
TOTAL CALCIUM	110	MG/L	SR
TOTAL CHROMIUM	<0.01	MG/L	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pico/Curies/Liter

Date of Report
08/02/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8757831

Page No.
02

TEST	CONCENTRATION		METHOD USED	ANALYSIS
TOTAL COPPER	<0.01	MG/L	EPA 220.1	ML
IRON	2.0	MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01	MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	49	MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.08	MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001	MG/L	EPA 245.1	ML
TOTAL SELENIUM	<0.01	MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01	MG/L	EPA 272.1	ML
TOTAL ZINC	0.07	MG/L	EPA 200.7	SH

Verified: *MTF/LG*

PPM - Parts/Million
PPB - Parts/Billion
(- Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
) - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 1020

Client: Iowa DNR Attn: Steve Grgurich
Client Address: F.O. #5
Des Moines, Iowa 50319

Project Identification: Metro East SLF Private Well Sampling
Client Sample Identification: Gas Deep Well
Date Sample Collected: 7/14/87
Date Sample Received: 7/15/87

ANALYTICAL RESULTS

UHL Lab No. 8757831

ANALYTE	CONCENTRATION (ug/L)	QUANTITATION LIMIT (ug/L)
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,2-DICHLOROETHANE	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
p-DICHLOROBENZENE	<1	1
TRICHLOROETHENE	<1	1

Analytical Method: EPA Method 524

Analyst: N. Mattix
Verified: 
Date Reported: 07/30/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8757932

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 07/15/87

Date of Report: 08/03/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUMNELLS
 Date Collected: 07/14/87 09:30:00

Sample Description: WATER, SHALLOW WELL
 Client Reference:

Comments

GAASS RES.
 METRO EAST LANDFILL, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
pH VALUE (LAB)	7.5	pH UNITS	CLK
SPEC. CONDUCTANCE	680	µMHOS @ 25 C	CLK
PHEN. ALKALINITY	NONE	MG/L AS CaCO3	CLK
TOTAL ALKALINITY	193	MG/L AS CaCO3	CLK
TOTAL HARDNESS	302	MG/L AS CaCO3	CLK
DISSOLVED SOLIDS	380	MG/L @180 C	JGT
SUSPENDED SOLIDS	3	MG/L @103 C	JGT
POTASSIUM	1.9	MG/L	ML
SODIUM	9.7	MG/L	SR
CHLORIDE	16	MG/L	CLK
FLUORIDE	0.3	MG/L	RWW
SULFATE	110	MG/L	BMM
AMMONIA (AS N)	<0.1	MG/L	RWW
NO2+NO3 AS NO3-N	9.5	MG/L	JAG
CHEMICAL OXYGEN DEMAND	14	MG/L	JAG
TOTAL ARSENIC	<0.01	MG/L	ML
TOTAL BARIUM	0.07	MG/L	SR
TOTAL CADMIUM	<0.001	MG/L	DC
TOTAL CALCIUM	48	MG/L	SR
TOTAL CHROMIUM	<0.01	MG/L	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion µG/L - Micrograms/Liter µG/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pico Curies/Liter

Date of Report
08/03/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8757832

Page No.
02

TEST	CONCENTRATION		METHOD USED	ANALYST
TOTAL COPPER	<0.01	MG/L	EPA 220.1	ML
IRON	0.27	MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01	MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	21	MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02	MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001	MG/L	EPA 245.1	ML
TOTAL SELENIUM	<0.01	MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01	MG/L	EPA 272.1	ML
TOTAL ZINC	0.04	MG/L	EPA 200.7	SR

Verified: MTF/LG

PPM - Parts/Million
PPB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico/Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 1020

Client: Iowa DNR Attn: Steve Grgurich
Client Address: F.O. #5
Des Moines, Iowa 50319

Project Identification: Metro East SLF Private Well Sampling
Client Sample Identification: Gas Shallow
Date Sample Collected: 7/14/87
Date Sample Received: 7/15/87

ANALYTICAL RESULTS

UHL Lab No. 0757832

<u>ANALYTE</u>	<u>CONCENTRATION</u> <u>(ug/L)</u>	<u>QUANTITATION</u> <u>LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CHLOROFORM	1	1
1,2-DICHLOROETHANE	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
p-DICHLOROBENZENE	<1	1
TRICHLOROETHENE	<1	1

Analytical Method: EPA Method 524

Analyst: N. Mattix
Verified: *[Signature]*
Date Reported: 07/30/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8757838

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 07/15/87

Date of Report: 08/03/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
 Date Collected: 07/14/87 12:30:00

Sample Description: WATER, DEEP WELL
 Client Reference:

Comments

SAMPSON RES.
 METRO EAST LANDFILL, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
pH VALUE (LAB)	7.45	pH UNITS	CLK
SPEC. CONDUCTANCE	1900	uMHOS @ 25 C	CLK
PHEN. ALKALINITY	NONE	MG/L AS CaCO3	CLK
TOTAL ALKALINITY	392	MG/L AS CaCO3	CLK
TOTAL HARDNESS	652	MG/L AS CaCO3	CLK
DISSOLVED SOLIDS	1320	MG/L @180 C	JGT
SUSPENDED SOLIDS	20	MG/L @103 C	JGT
POTASSIUM	10	MG/L	ML
SODIUM	170	MG/L	SR
CHLORIDE	9.5	MG/L	CLK
FLUORIDE	1.2	MG/L	RWW
SULFATE	720	MG/L	SMM
AMMONIA (AS N)	8.8	MG/L	RWW
NO2+NO3 AS NO3-N	<0.1	MG/L	JAG
CHEMICAL OXYGEN DMND	10	MG/L	JAG
TOTAL ARSENIC	<0.01	MG/L	ML
TOTAL BARIUM	<0.05	MG/L	SR
TOTAL CADMIUM	<0.001	MG/L	DC
TOTAL CALCIUM	150	MG/L	SR
TOTAL CHROMIUM	<0.01	MG/L	DC

PDM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pico/Curies/Liter

Date of Report
08/03/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8757838

Page No.
02

TEST	CONCENTRATION		METHOD USED	ANALY
-----	-----	-----	-----	-----
TOTAL COPPER	<0.01	MG/L	EPA 220.1	ML
IRON	9.7	MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01	MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	67	MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.08	MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001	MG/L	EPA 245.1	ML
TOTAL SELENIUM	<0.01	MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01	MG/L	EPA 272.1	ML
TOTAL ZINC	4.2	MG/L	EPA 200.7	SR

Verified: MTF/LG

PPM - Parts/Million
PBB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - picocuries/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 1020

Client: Iowa DNR Attn: Steve Grgurich
Client Address: F.O. #5
Des Moines, Iowa 50319

Project Identification: Metro East SLF Private Well Sampling
Client Sample Identification: Sampson Deep Well
Date Sample Collected: 7/14/87
Date Sample Received: 7/15/87

ANALYTICAL RESULTS

UHL Lab No. 8257838

<u>ANALYTE</u>	<u>CONCENTRATION (ug/L)</u>	<u>QUANTITATION LIMIT (ug/L)</u>
<u>VINYL CHLORIDE</u>	<u><1</u>	<u>1</u>
<u>1,1-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CHLOROFORM</u>	<u><1</u>	<u>1</u>
<u>1,2-DICHLOROETHANE</u>	<u><1</u>	<u>1</u>
<u>1,1,1-TRICHLOROETHANE</u>	<u><1</u>	<u>1</u>
<u>CARBON TETRACHLORIDE</u>	<u><1</u>	<u>1</u>
<u>BROMODICHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>DIBROMOCHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>BENZENE</u>	<u><1</u>	<u>1</u>
<u>BROMOFORM</u>	<u><1</u>	<u>1</u>
<u>p-DICHLOROBENZENE</u>	<u><1</u>	<u>1</u>
<u>TRICHLOROETHENE</u>	<u><1</u>	<u>1</u>

Analytical Method: EPA Method 524

Analyst: N. Mattix
Verified: 
Date Reported: 07/30/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8757888

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 07/15/87

Date of Report: 08/03/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUNNELLS
 Date Collected: 07/15/87 11:00:00

Sample Description: WATER, SHALLOW WELL
 Client Reference:

Comments

WAYNE MILLER FARM
 METRO EAST LANDFILL, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
pH VALUE (LAB)	7.55	pH UNITS	CLK
SEEC. CONDUCTANCE	810	uMHOS @ 25 C	CLK
PHEN. ALKALINITY	NONE	MG/L AS CaCO3	CLK
TOTAL ALKALINITY	292	MG/L AS CaCO3	CLK
TOTAL HARDNESS	432	MG/L AS CaCO3	CLK
DISSOLVED SOLIDS	470	MG/L @180 C	JGT
SUSPENDED SOLIDS	<1	MG/L @103 C	JGT
POTASSIUM	0.9	MG/L	ML
SODIUM	8.4	MG/L	SR
CHLORIDE	76	MG/L	CLK
FLUORIDE	0.5	MG/L	RW
SULFATE	60	MG/L	SMM
AMMONIA (AS N)	<0.1	MG/L	RW
NO2+NO3 AS NO3-N	16	MG/L	JAG
CHEMICAL OXYGEN DEMD	13	MG/L	JAG
TOTAL ARSENIC	<0.01	MG/L	ML
TOTAL BARIUM	0.13	MG/L	SR
TOTAL CADMIUM	<0.001	MG/L	DC
TOTAL CALCIUM	100	MG/L	SR
TOTAL CHROMIUM	<0.01	MG/L	LAF

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pico Curies/Liter

Date of Report
08/03/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8757888

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYSIS
TOTAL COPPER	<0.01 MG/L	EPA 220.1	ML
IRON	<0.02 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	38 MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	DC
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01 MG/L	EPA 272.1	ML
TOTAL ZINC	0.08 MG/L	EPA 200.7	SR

Verified: *WTF/LG*

PPM - Parts/Million
PBB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - picocuries/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 1020

Client: Iowa DNR Attn: Steve Grgurich
Client Address: F.O. #5
Des Moines, Iowa 50319

Project Identification: Metro East SLF Private Well Sampling
Client Sample Identification: Wayne Miller shallow well

Date Sample Collected: 7/15/87
Date Sample Received: 7/15/87

ANALYTICAL RESULTS

UHL Lab No. 8252888

ANALYTE	CONCENTRATION (ug/L)	QUANTITATION LIMIT (ug/L)
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,2-DICHLOROETHANE	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
p-DICHLOROBENZENE	<1	1
TRICHLOROETHENE	<1	1

Analytical Method: EPA Method 524

Analyst: N. Mattix
Verified: 
Date Reported: 07/31/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8757889

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 07/15/87

Date of Report: 08/03/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: RUNNELLS
 Date Collected: 07/15/87 11:00:00

Sample Description: WATER, DEEP WELL
 Client Reference:

Comments

WAYNE MILLER FARM
 METRO EAST LANDFILL, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
-----	-----	-----	-----
pH VALUE (LAB)	8.1	pH UNITS	EPA 150.1
SPEC. CONDUCTANCE	3200	uMHOS @ 25 C	EPA 120.1
PHEN. ALKALINITY	NONE	MG/L AS CaCO3	EPA 310.1
TOTAL ALKALINITY	326	MG/L AS CaCO3	EPA 310.1
TOTAL HARDNESS	256	MG/L AS CaCO3	EPA 130.2
DISSOLVED SOLIDS	2200	MG/L @180 C	EPA 160.1
SUSPENDED SOLIDS	13	MG/L @103 C	EPA 160.2
POTASSIUM	7.8	MG/L	EPA 258.1
SODIUM	660	MG/L	EPA 200.7
CHLORIDE	67	MG/L	EPA 325.3
FLUORIDE	2.4	MG/L	USCS 14327
SULFATE	1100	MG/L	EPA 275.4
AMMONIA (AS N)	1.1	MG/L	EPA 350.1
NO2+NO3 AS NO3-N	0.5	MG/L	EPA 353.2
CHEMICAL OXYGEN DMND	4	MG/L	EPA 410.1
TOTAL ARSENIC	<0.01	MG/L	EPA 206.2
TOTAL BARIUM	<0.05	MG/L	EPA 200.7
TOTAL CADMIUM	<0.001	MG/L	EPA 213.2
TOTAL CALCIUM	58	MG/L	EPA 200.7
TOTAL CHROMIUM	<0.01	MG/L	EPA 218.2

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PFB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pico Curies/Liter

Date of Report
08/08/67

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8757889

Page No.
02

TEST	CONCENTRATION		METHOD USED	ANALYSIS
TOTAL COPPER	0.04	MG/L	EPA 220.1	ML
IRON	7.1	MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01	MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	21	MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.03	MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001	MG/L	EPA 245.1	DC
TOTAL SELENIUM	<0.01	MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01	MG/L	EPA 272.1	ML
TOTAL ZINC	0.55	MG/L	EPA 200.7	SR

Verified: MTF/LG

PPM - Parts/Million
PPB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico, Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 1020

Client: Iowa DNR Attn: Steve Grgurich
Client Address: F.O. #5
Des Moines, Iowa 50319

Project Identification: Metro East SLF Private Well Sampling
Client Sample Identification: Wayne Miller deep well

Date Sample Collected: 7/15/87
Date Sample Received: 7/15/87

ANALYTICAL RESULTS

UHL Lab No. 8757889

<u>ANALYTE</u>	<u>CONCENTRATION (ug/L)</u>	<u>QUANTITATION LIMIT (ug/L)</u>
<u>VINYL CHLORIDE</u>	<u><1</u>	<u>1</u>
<u>1,1-DICHLOROETHENE</u>	<u><1</u>	<u>1</u>
<u>CHLOROFORM</u>	<u><1</u>	<u>1</u>
<u>1,2-DICHLOROETHANE</u>	<u><1</u>	<u>1</u>
<u>1,1,1-TRICHLOROETHANE</u>	<u><1</u>	<u>1</u>
<u>CARBON TETRACHLORIDE</u>	<u><1</u>	<u>1</u>
<u>BROMODICHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>DIBROMOCHLOROMETHANE</u>	<u><1</u>	<u>1</u>
<u>BENZENE</u>	<u><1</u>	<u>1</u>
<u>BROMOFORM</u>	<u><1</u>	<u>1</u>
<u>p-DICHLOROBENZENE</u>	<u><1</u>	<u>1</u>
<u>TRICHLOROETHENE</u>	<u><1</u>	<u>1</u>

Analytical Method: EPA Method 524

Analyst: N. Mattix
Verified: 
Date Reported: 07/31/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8757890

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 07/15/87

Date of Report: 08/03/87

Submitter: EPD S
 Address: WALLACE HLDC
 City: DES MOINES, IA 50319

Sample Location: RUNNELLS
 Date Collected: 07/15/87 11:30:00

Sample Description: WATER, SHALLOW WELL
 Client Reference:

Comments

DON MILLER FARM
 METRO EAST LANDFILL, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
pH VALUE (LAB)	7.4	pH UNITS	CLK
SPEC. CONDUCTANCE	1000	uMHOS @ 25 C	CLK
PHEN. ALKALINITY	NONE	MG/L AS CaCO3	CLK
TOTAL ALKALINITY	212	MG/L AS CaCO3	CLK
TOTAL HARDNESS	494	MG/L AS CaCO3	CLK
DISSOLVED SOLIDS	650	MG/L @180 C	JGT
SUSPENDED SOLIDS	<1	MG/L @103 C	JGT
POTASSIUM	0.9	MG/L	ML
SODIUM	12	MG/L	SR
CHLORIDE	53	MG/L	CLK
FLUORIDE	0.3	MG/L	RWW
SULFATE	48	MG/L	SMM
AMMONIA (AS N)	<0.1	MG/L	RWW
NO2+NO3 AS NO3-N	42	MG/L	JAG
CHEMICAL OXYGEN DMND	9	MG/L	JAG
TOTAL ARSENIC	<0.01	MG/L	ML
TOTAL BARIUM	0.07	MG/L	SR
TOTAL CADMIUM	<0.001	MG/L	DC
TOTAL CALCIUM	110	MG/L	SR
TOTAL CHROMIUM	<0.01	MG/L	LAF

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

Date of Report
06/03/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8757890

Page No.
03

TEST	CONCENTRATION		METHOD USED	ANALYST
-----	-----	-----	-----	-----
TOTAL COPPER	0.06	MG/L	EPA 220.1	ML
IRON	0.04	MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01	MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	48	MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02	MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001	MG/L	EPA 245.1	DC
TOTAL SELENIUM	<0.01	MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01	MG/L	EPA 272.1	ML
TOTAL ZINC	0.02	MG/L	EPA 200.7	SR

Verified: *MTF/LG*

PPM - Parts/Million
PPB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
uG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
uG/KG - Micrograms/Kilogram
pCi/L - pico/ Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 1020

Client: Iowa DNR Attn: Steve Grgurich
Client Address: F.O. #5
Des Moines, Iowa 50319

Project Identification: Metro East SLF Private Well Sampling
Client Sample Identification: Don Miller shallow well

Date Sample Collected: 7/15/87
Date Sample Received: 7/15/87

ANALYTICAL RESULTS

UHL Lab No. 8757890

ANALYTE	CONCENTRATION (ug/L)	QUANTITATION LIMIT (ug/L)
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,2-DICHLOROETHANE	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
p-DICHLOROBENZENE	<1	1
TRICHLOROETHENE	<1	1

Analytical Method: EPA Method 524

Analyst: N. Mattix
Verified: 
Date Reported: 07/31/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8787841

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 07/15/87

Date of Report: 08/03/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
 Date Collected: 07/14/87 01:00:00

Sample Description: WATER, SHALLOW WELL
 Client Reference:

Comments

JOHNSTON HAND PUMP
 METRO EAST LANDFILL, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
pH VALUE (LAB)	7.9	pH UNITS	CLK
SPEC. CONDUCTANCE	980	uMHOS @ 25 C	CLK
PHEN. ALKALINITY	NONE	MG/L AS CaCO3	CLK
TOTAL ALKALINITY	288	MG/L AS CaCO3	CLK
TOTAL HARDNESS	470	MG/L AS CaCO3	CLK
DISSOLVED SOLIDS	570	MG/L @180 C	JGT
SUSPENDED SOLIDS	<1	MG/L @100 C	JGT
POTASSIUM	1.4	MG/L	ML
SODIUM	37	MG/L	SR
CHLORIDE	48	MG/L	CLK
FLUORIDE	0.35	MG/L	RWW
SULFATE	78	MG/L	SMM
AMMONIA (AS N)	<0.1	MG/L	RWW
NO2+NO3 AS NO3-N	20	MG/L	JAC
CHEMICAL OXYGEN DEMD	10	MG/L	JAC
TOTAL ARSENIC	<0.01	MG/L	ML
TOTAL BARIUM	0.17	MG/L	SR
TOTAL CADMIUM	<0.001	MG/L	DC
TOTAL CALCIUM	110	MG/L	SR
TOTAL CHROMIUM	<0.01	MG/L	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPS - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pico Curies/Liter

Date of Report
08/03/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8757841

Page No.
02

TEST	CONCENTRATION		METHOD USED	ANALYSIS
TOTAL COPPER	<0.01	MG/L	EPA 220.1	ML
IRON	0.35	MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01	MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	35	MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02	MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001	MG/L	EPA 245.1	ML
TOTAL SELENIUM	<0.01	MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01	MG/L	EPA 272.1	ML
TOTAL ZINC	0.76	MG/L	EPA 200.7	SR

Verified: *MTF/LG*

PPM - Parts/Million
PPB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico/Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 1020

Client: Iowa DNR Attn: Steve Grgurich
Client Address: F.O. #5
Des Moines, Iowa 50319

Project Identification: Metro East SLF Private Well Sampling
Client Sample Identification: Johnston Hand Pump Shallow Well
Date Sample Collected: 7/14/87
Date Sample Received: 7/15/87

ANALYTICAL RESULTS

UHL Lab No. 8757841

<u>ANALYTE</u>	<u>CONCENTRATION (ug/L)</u>	<u>QUANTITATION LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,2-DICHLOROETHANE	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
p-DICHLOROBENZENE	<1	1
TRICHLOROETHENE	<1	1

Analytical Method: EPA Method 524

Analyst: N. Mattix
Verified: *[Signature]*
Date Reported: 07/30/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 0757839

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 07/15/87

Date of Report: 08/03/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
 Date Collected: 07/14/87 01:00:00

Sample Description: WATER, DEEP WELL
 Client Reference:

Comments

JOHNSTON RES.
 METRO EAST LANDFILL, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
pH VALUE (LAB)	7.8 pH UNITS	EPA 150.1	CLK
SPEC. CONDUCTANCE	1200 µMHOS @ 25 C	EPA 120.1	CLK
PHEN. ALKALINITY	NONE MG/L AS CaCO3	EPA 310.1	CLK
TOTAL ALKALINITY	548 MG/L AS CaCO3	EPA 310.1	CLK
TOTAL HARDNESS	545 MG/L AS CaCO3	EPA 130.2	CLK
DISSOLVED SOLIDS	720 MG/L @180 C	EPA 160.1	JGT
SUSPENDED SOLIDS	7 MG/L @103 C	EPA 160.2	JGT
POTASSIUM	12 MG/L	EPA 258.1	ML
SODIUM	68 MG/L	EPA 200.7	SR
CHLORIDE	9.5 MG/L	EPA 325.3	CLK
FLUORIDE	0.3 MG/L	USGS 14327	RWW
SULFATE	150 MG/L	EPA 275.4	SMM
AMMONIA (AS N)	4.0 MG/L	EPA 350.1	RWW
NO2+NO3 AS NO3-N	<0.1 MG/L	EPA 353.2	JAC
CHEMICAL OXYGEN DMND	14 MG/L	EPA 410.1	JAC
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	ML
TOTAL BARIUM	<0.05 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CALCIUM	120 MG/L	EPA 200.7	SR
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	LAF

PPM - Parts/Million
 PPB - Parts/Billion
 < - Less than

MG/L - Milligrams/Liter
 µG/L - Micrograms/Liter
 > - Greater than

MG/KG - Milligrams/Kilogram
 µG/KG - Micrograms/Kilogram
 pCi/L - pico Curies/Liter

Date of Report
5/2/67

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Page No.

Analytical Report for Sample Number 8757839

02

TEST	CONCENTRATION	METHOD USED	ANALYSIS
TOTAL COPPER	<0.01 MG/L	EPA 220.1	ML
IRON	3.6 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	48 MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.15 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 243.1	ML
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01 MG/L	EPA 272.1	ML
TOTAL ZINC	0.48 MG/L	EPA 200.7	SR

Verified: MTF

PPM - Parts/Million
PPB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pice/Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 1020

Client: Iowa DNR Attn: Steve Grgurich
Client Address: F.O. #5
Des Moines, Iowa 50319

Project Identification: Metro East SLF Private Well Sampling
Client Sample Identification: Johnston Deep Well
Date Sample Collected: 7/14/87
Date Sample Received: 7/15/87

ANALYTICAL RESULTS

UHL Lab No. 8752839

ANALYTE	CONCENTRATION (ug/L)	QUANTITATION LIMIT (ug/L)
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,2-DICHLOROETHANE	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
p-DICHLOROBENZENE	<1	1
TRICHLOROETHENE	<1	1

Analytical Method: EPA Method 524

Analyst: N. Mattix
Verified: *[Signature]*
Date Reported: 07/30/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8757840

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 07/15/87

Date of Report: 08/03/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
 Date Collected: 07/14/87 01:00:00

Sample Description: WATER, SHALLOW WELL
 Client Reference:

Comments

JOHNSTON FARM, PASTURE
 METRO EAST LANDFILL, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION		METHOD USED	ANALYST
pH VALUE (LAB)	7.25	pH UNITS	EPA 150.1	CLK
SPEC. CONDUCTANCE	460	UMHOS @ 25 C	EPA 120.1	CLK
PHEN. ALKALINITY	NONE	MG/L AS CaCO3	EPA 310.1	CLK
TOTAL ALKALINITY	154	MG/L AS CaCO3	EPA 310.1	CLK
TOTAL HARDNESS	228	MG/L AS CaCO3	EPA 130.2	CLK
DISSOLVED SOLIDS	240	MG/L @180 C	EPA 140.1	JGT
SUSPENDED SOLIDS	5	MG/L @103 C	EPA 140.2	JGT
POTASSIUM	2.9	MG/L	EPA 258.1	ML
SODIUM	7.0	MG/L	EPA 200.7	SR
CHLORIDE	18	MG/L	EPA 325.3	CLK
FLUORIDE	0.25	MG/L	USGS 14327	RWW
SULFATE	28	MG/L	EPA 275.4	SMM
AMMONIA (AS N)	<0.1	MG/L	EPA 350.1	RWW
NO2+NO3 AS NO3-N	4.9	MG/L	EPA-353.2	JAG
CHEMICAL OXYGEN DMND	18	MG/L	EPA 410.1	JAG
TOTAL ARSENIC	<0.01	MG/L	EPA 206.2	ML
TOTAL BARIUM	0.21	MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001	MG/L	EPA 213.2	DC
TOTAL CALCIUM	55	MG/L	EPA 200.7	SR
TOTAL CHROMIUM	<0.01	MG/L	EPA 218.2	DC

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pico/Curies/Liter

Date of Report
08/03/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8757840

Page No.
02

TEST	CONCENTRATION		METHOD USED	ANALYST
TOTAL COPPER	<0.01	MG/L	EPA 220.1	ML
IRON	0.21	MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01	MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	18	MG/L	EPA 200.7	SR
TOTAL MANGANESE	<0.02	MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001	MG/L	EPA 245.1	ML
TOTAL SELENIUM	<0.01	MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01	MG/L	EPA 272.1	ML
TOTAL ZINC	0.04	MG/L	EPA 200.7	SR

Verified: *MTF/LB*

PPM - Parts/Million
PPB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
UG/L - Micrograms/Liter
) - Greater than

MG/KG - Milligrams/Kilogram
UG/KG - Micrograms/Kilogram
pCi/L - pico Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 1020

Client: Iowa DNR Attn: Steve Grgurich
Client Address: F.O. #5
Des Moines, Iowa 50319

Project Identification: Metro East SLF Private Well Sampling
Client Sample Identification: Johnston Pasture Shallow Well
Date Sample Collected: 7/14/87
Date Sample Received: 7/15/87

ANALYTICAL RESULTS

UHL Lab No. 8252840

<u>ANALYTE</u>	<u>CONCENTRATION (ug/L)</u>	<u>QUANTITATION LIMIT (ug/L)</u>
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,2-DICHLOROETHANE	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
p-DICHLOROBENZENE	<1	1
TRICHLOROETHENE	<1	1

Analytical Method: EPA Method 524

Analyst: N. Mattix
Verified: 
Date Reported: 07/30/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8757834

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 395-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 07/15/87

Date of Report: 08/03/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: MITCHELLVILLE
 Date Collected: 07/14/87 10:10:00

Sample Description: WATER, DEEP WELL
 Client Reference:

Comments

SOUTTER FARM
 METRO EAST LANDFILL, WELLS

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
-----	-----	-----	-----
pH VALUE (LAB)	7.65 pH UNITS	EPA 150.1	CLK
SPEC. CONDUCTANCE	2000 μ MHOS @ 25 C	EPA 120.1	CLK
PHEN. ALKALINITY	NONE MG/L AS CaCO ₃	EPA 310.1	CLK
TOTAL ALKALINITY	448 MG/L AS CaCO ₃	EPA 310.1	CLK
TOTAL HARDNESS	458 MG/L AS CaCO ₃	EPA 130.2	CLK
DISSOLVED SOLIDS	1380 MG/L @180 C	EPA 140.1	JGT
SUSPENDED SOLIDS	6 MG/L @103 C	EPA 160.2	JGT
POTASSIUM	7.9 MG/L	EPA 258.1	ML
SODIUM	320 MG/L	EPA 200.7	SR
CHLORIDE	7.0 MG/L	EPA 325.3	CLK
FLUORIDE	1.4 MG/L	USGS 14327	RWW
SULFATE	710 MG/L	EPA 275.4	SMM
AMMONIA (AS N)	2.4 MG/L	EPA 350.1	RWW
NO ₂ +NO ₃ AS NO ₃ -N	<0.1 MG/L	EPA 353.2	JAC
CHEMICAL OXYGEN DEMD	14 MG/L	EPA 410.1	JAC
TOTAL ARSENIC	<0.01 MG/L	EPA 204.2	ML
TOTAL BARIUM	<0.05 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CALCIUM	100 MG/L	EPA 200.7	SR
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC

PPM - Parts/Million
 PPM - Parts/Million
 < - Less than

MG/L - Milligrams/Liter
 μ G/L - Micrograms/Liter
 > - Greater than

MG/KG - Milligrams/Kilogram
 μ G/KG - Micrograms/Kilogram
 pCi/L - pico Curies/Liter

Date of Report
06/08/87

UNIVERSITY OF IOWA - HYGIENIC LABORATORY
Analytical Report for Sample Number 8757834

Page No.
02

TEST	CONCENTRATION	METHOD USED	ANALYST
TOTAL COPPER	<0.01 MG/L	EPA 220.1	ML
IRON	3.4 MG/L	EPA 200.7	SR
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MAGNESIUM	39 MG/L	EPA 200.7	SR
TOTAL MANGANESE	0.02 MG/L	EPA 200.7	SR
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	ML
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01 MG/L	EPA 272.1	ML
TOTAL ZINC	0.12 MG/L	EPA 200.7	SR

Verified: *MTF/LB*

P/M - Parts/Million
PPB - Parts/Billion
< - Less than

MG/L - Milligrams/Liter
µG/L - Micrograms/Liter
> - Greater than

MG/KG - Milligrams/Kilogram
µG/KG - Micrograms/Kilogram
pCi/L - pico, Curies/Liter

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 1020

Client: Iowa DNR Attn: Steve Grgurich
Client Address: F.O. #5
Des Moines, Iowa 50319

Project Identification: Metro East SLF Private Well Sampling
Client Sample Identification: Soutter
Date Sample Collected: 7/14/87
Date Sample Received: 7/15/87

ANALYTICAL RESULTS

UHL Lab No. 8757834

ANALYTE	CONCENTRATION (ug/L)	QUANTITATION LIMIT (ug/L)
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,2-DICHLOROETHANE	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
p-DICHLOROBENZENE	<1	1
TRICHLOROETHENE	<1	1

Analytical Method: EPA Method 524

Analyst: N. Mattix
Verified: *[Signature]*
Date Reported: 07/30/87

UNIVERSITY HYGIENIC LABORATORY
Analytical Report
Finnigan 1020

Client: Iowa DNR Attn: Steve Grgurich
Client Address: F.O. #5
Des Moines, Iowa 50319

Project Identification: Metro East SLF Private Well Sampling
Client Sample Identification: Shipping Blank
Date Sample Collected: 7/14/87
Date Sample Received: 7/15/87

ANALYTICAL RESULTS

UHL Lab No. 8757946

ANALYTE	CONCENTRATION (ug/L)	QUANTITATION LIMIT (ug/L)
VINYL CHLORIDE	<1	1
1,1-DICHLOROETHENE	<1	1
CHLOROFORM	<1	1
1,2-DICHLOROETHANE	<1	1
1,1,1-TRICHLOROETHANE	<1	1
CARBON TETRACHLORIDE	<1	1
BROMODICHLOROMETHANE	<1	1
DIBROMOCHLOROMETHANE	<1	1
BENZENE	<1	1
BROMOFORM	<1	1
p-DICHLOROBENZENE	<1	1
TRICHLOROETHENE	<1	1

Analytical Method: EPA Method 524

Analyst: N. Mattix
Verified: *[Signature]*
Date Reported: 07/30/87

APPENDIX F

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 0755750

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-3371

Date Received: 06/01/87

Date of Report: 06/22/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: DM METRO EAST BLF
 Date Collected: 05/29/87 09:25:00

Sample Description: WATER, CAMP CREEK
 Client Reference: S CRGURICH

Comments

UPSTREAM NORTH OF HWY 163.
 M_DT, COD, OC_T, CN_T, PHEN, TOT-HEAVY METALS.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
DISSOLVED SOLIDS	370 MG/L @100 C	EPA 169.1	JCT
CHEMICAL OXYGEN DEMD	0 MG/L	EPA 410.1	JAC
TOTAL ORGANIC CARBON	3.1 MG/L	EPA 415.1	RWW
TOTAL CYANIDE	<0.01 MG/L	EPA 335.2	PE
PHENOLS (4AAP REAC.)	<10 uG/L	EPA 420.2	RWW
TOTAL ARSENIC	<0.01 MG/L	EPA 204.2	DC
TOTAL BARIUM	0.14 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.02 MG/L	EPA 200.7	SR
TOTAL COPPER	0.03 MG/L	EPA 220.1	DC
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	ML
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	DC
TOTAL SILVER	<0.01 MG/L	EPA 272.1	DC
TOTAL ZINC	0.12 MG/L	EPA 300.7	SR

Verified: *[Signature]*

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPH - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 < - Less than) - Greater than pCi/L - pico Curies/Liter

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8755751

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-3371

Date Received: 06/01/87

Date of Report: 06/22/87

Submitter: EPD 3
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

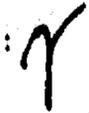
Sample Location: S_DT,COD,OC_T,CM_T,P Sample Description: WATER,CAMP CREEK
 Date Collected: 05/29/87 09:25:00 Client Reference: S GRGURICH

Comments

DUPLICATE SAMPLE-UPSTREAM CAMP CREEK NORTH OF HWY 163.
 S_DT,COD,OC_T,CM_T,PHEN,TOT-HEAVY METALS.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
DISSOLVED SOLIDS	360 MG/L @180 C	EPA 160.1	JGT
CHEMICAL OXYGEN DEMD	0 MG/L	EPA 410.1	JAC
TOTAL ORGANIC CARBON	3.2 MG/L	EPA 415.1	RWV
TOTAL CYANIDE	<0.01 MG/L	EPA 335.2	PE
PHENOLS (4AAP REAC.)	<10 ug/L	EPA 420.2	RWV
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	DC
TOTAL BARIUM	0.15 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.02 MG/L	EPA 200.7	SR
TOTAL COPPER	<0.01 MG/L	EPA 220.1	DC
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	ML
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	DC
TOTAL SILVER	<0.01 MG/L	EPA 272.1	DC
TOTAL ZINC	0.07 MG/L	EPA 200.7	SR

Verified: 

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPM - Parts/Million ug/L - Micrograms/Liter ug/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 0785752

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 06/01/87

Date of Report: 06/22/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: DM METRO EAST SLP
 Date Collected: 05/29/87 10:25:00

Sample Description: WATER, CAMP CREEK
 Client Reference: S GRGURICH

Comments

NORTH TRIB, NORTH OF HWY 163.
 S_DT, COD, OC_T, CN_T, PHEN, TOT-HEAVY METALS.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
DISSOLVED SOLIDS	350 MG/L @100 C	EPA 140.1	JGT
CHEMICAL OXYGEN DEMD	0 MG/L	EPA 410.1	JAG
TOTAL ORGANIC CARBON	2.4 MG/L	EPA 415.1	RWW
TOTAL CYANIDE	<0.01 MG/L	EPA 335.2	PH
PHENOLS (4AAP REAC.)	<10 ug/L	EPA 420.2	RWW
TOTAL ARSENIC	<0.01 MG/L	EPA 206.3	DC
TOTAL BARIUM	0.22 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.02 MG/L	EPA 200.7	SR
TOTAL COPPER	<0.01 MG/L	EPA 120.1	DC
TOTAL LEAD	<0.01 MG/L	EPA 139.2	DC
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	NL
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	DC
TOTAL SILVER	<0.01 MG/L	EPA 272.1	DC
TOTAL ZINC	0.03 MG/L	EPA 200.7	SR

Verified: 

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion ug/L - Micrograms/Liter ug/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pice Curies/Liter

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 5755753

Iowa City Laboratory
 Oakdale Hall
 Iowa City IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 06/01/87

Date of Report: 06/22/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: DM METRO EAST SLP
 Date Collected: 05/29/87 11:15:00

Sample Description: WATER, CAMP CREEK
 Client Reference: S GRGURICH

Comments

NORTH MIDDLE PRIOR TO JCT. OF NORTH TRIB.
 S_DT, COD, OC_T, CN_T, PHEN, TOT-HEAVY METALS.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
DISSOLVED SOLIDS	370 MG/L @180 C	EPA 160.1	JGT
CHEMICAL OXYGEN DMND	16 MG/L	EPA 410.1	JAC
TOTAL ORGANIC CARBON	3.1 MG/L	EPA 415.1	HW
TOTAL CYANIDE	<0.01 MG/L	EPA 335.2	FB
PHENOLS (4AAP REAC.)	<10 uG/L	EPA 420.2	RW
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	DC
TOTAL BARIUM	0.16 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.01 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.02 MG/L	EPA 218.2	DC
TOTAL COPPER	0.01 MG/L	EPA 220.1	DC
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	ME
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	DC
TOTAL SILVER	<0.01 MG/L	EPA 272.1	DC
TOTAL ZINC	0.08 MG/L	EPA 200.7	SR

Verified: *[Signature]*

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPF - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8755754

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 W.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-3371

Date Received: 06/01/87

Date of Report: 06/22/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: DM METRO EAST SLP
 Date Collected: 05/29/87 10:45:00

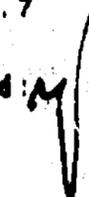
Sample Description: WATER,
 Client Reference: S CRGURICH

Comments

NORTH TRIB PRIOR TO JCT WITH CAMP CREEK.
 S_DT, COD, OC_T, CN_T, PHEN, TOT-HEAVY METALS.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
DISSOLVED SOLIDS	390 MG/L @180 C	EPA 160.1	JGT
CHEMICAL OXYGEN DMND	8 MG/L	EPA 410.1	JAG
TOTAL ORGANIC CARBON	2.9 MG/L	EPA 415.1	RWW
TOTAL CYANIDE	<0.01 MG/L	EPA 335.2	FB
PHENOLS (4AAP REAC.)	<10 uG/L	EPA 420.2	RWW
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	DC
TOTAL BARIUM	0.18 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.02 MG/L	EPA 200.7	SR
TOTAL COPPER	<0.01 MG/L	EPA 220.1	DC
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	ML
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	DC
TOTAL SILVER	<0.01 MG/L	EPA 272.1	DC
TOTAL ZINC	0.05 MG/L	EPA 200.7	SR

Verified: 

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pico Curies/Liter

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8755755

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 W.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-3371

Date Received: 06/01/87

Date of Report: 06/22/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: DM METRO EAST SLF
 Date Collected: 05/29/87 12:45:00

Sample Description: WATER,
 Client Reference: S GRGURICH

Comments

SOUTH TRIM PRIOR TO JCT. OF CAMP CREEK.
 S_DT, COD, DC_T, CN_T, PHEN, TOT-HEAVY METALS.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
DISSOLVED SOLIDS	290 MG/L @180 C	EPA 140.1	JGT
CHEMICAL OXYGEN DEMD	20 MG/L	EPA 410.1	JAC
TOTAL ORGANIC CARBON	4.0 MG/L	EPA 415.1	RW
TOTAL CYANIDE	<0.01 MG/L	EPA 335.2	FB
PHENOLS (4AAP REAC.)	<10 ug/L	EPA 420.2	RW
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	DC
TOTAL BARIUM	0.14 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.02 MG/L	EPA 200.7	SR
TOTAL COPPER	0.01 MG/L	EPA 220.1	DC
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	ML
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	DC
TOTAL SILVER	<0.01 MG/L	EPA 272.1	DC
TOTAL ZINC	0.07 MG/L	EPA 200.7	SR

Verified: *W*

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion ug/L - Micrograms/Liter ug/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8755756

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 06/01/87

Date of Report: 06/22/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: DM METRO EAST SLP
 Date Collected: 05/29/87 12:55:00

Sample Description: WATER, CAMP CREEK
 Client Reference: S GRGURICH

Comments

MIDDLE, SOUTH OF JCT. OF SOUTH TRIM.
 S_DT, COD, OC_T, CH_T, PHEN, TOT-HEAVY METALS.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
DISSOLVED SOLIDS	360 MG/L @180 C	EPA 160.1	JGT
CHEMICAL OXYGEN DEMD	12 MG/L	EPA 410.1	JAG
TOTAL ORGANIC CARBON	3.4 MG/L	EPA 415.1	RWW
TOTAL CYANIDE	<0.01 MG/L	EPA 335.2	PE
PHENOLS (4AAP REAC.)	<10 uG/L	EPA 420.2	RWW
TOTAL ARSENIC	<0.01 MG/L	EPA 106.2	DC
TOTAL BARIUM	0.16 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.02 MG/L	EPA 200.7	SR
TOTAL COPPER	<0.01 MG/L	EPA 220.1	DC
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	ML
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	DC
TOTAL SILVER	<0.01 MG/L	EPA 272.1	DC
TOTAL ZINC	0.04 MG/L	EPA 200.7	SR

Verified: *M*

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPM - Parts/Million uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 4755757

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 N.A. Wallace Building
 Des Moines, IA 50319
 (319) 281-5371

Date Received: 06/01/87

Date of Report: 06/22/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: DM METRO EAST SLF
 Date Collected: 05/29/87 13:45:00

Sample Description: WATER, CAMP CREEK
 Client Reference: S GRGURICH

Comments

DOWNSTREAM AT SE 4TH STREET BRIDGE.
 S_DT, COD, OC_T, CN_T, PHEN, TOT-HEAVY METALS.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
DISSOLVED SOLIDS	340 MG/L @180 C	EPA 160.1	JGT
CHEMICAL OXYGEN DEMAND	12 MG/L	EPA 410.1	JAG
TOTAL ORGANIC CARBON	3.4 MG/L	EPA 415.1	RWW
TOTAL CYANIDE	<0.01 MG/L	EPA 335.2	FB
PHENOLS (4AAF REAC.)	<10 uG/L	EPA 420.2	RWW
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	DC
TOTAL BARIUM	0.16 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC
TOTAL COPPER	<0.01 MG/L	EPA 220.1	DC
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	HL
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	DC
TOTAL SILVER	<0.01 MG/L	EPA 272.1	DC
TOTAL ZINC	0.04 MG/L	EPA 200.7	SR

Verified: *[Signature]*

PPM - Parts/Million MG/L - Milligrams/Liter MC/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8735758

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 06/01/87

Date of Report: 06/22/87

Submitter: EPD 3
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: DM METRO EAST SLF
 Date Collected: 05/29/87 14:00:00

Sample Description: WATER, CAMP CREEK
 Client Reference: S GRGURICH

Comments

DOWNSTREAM S. MILLER DRIVE.
 S_DT, COD, OC_T, CN_T, PHEN, TOT-HEAVY METALS.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION		METHOD USED	ANALYST
DISSOLVED SOLIDS	330	MG/L @100 C	EPA 160.1	JGT
CHEMICAL OXYGEN DMND	12	MG/L	EPA 410.1	JAC
TOTAL ORGANIC CARBON	3.2	MG/L	EPA 415.1	RWW
TOTAL CYANIDE	<0.01	MG/L	EPA 335.2	PE
PHENOLS (4AAP REAC.)	10	UG/L	EPA 420.2	RWW
TOTAL ARSENIC	<0.01	MG/L	EPA 206.2	DC
TOTAL BARIUM	0.16	MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001	MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.02	MG/L	EPA 200.7	SR
TOTAL COPPER	0.02	MG/L	EPA 220.1	DC
TOTAL LEAD	<0.01	MG/L	EPA 239.2	DC
TOTAL MERCURY	<0.001	MG/L	EPA 245.1	RL
TOTAL NICKEL	<0.05	MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01	MG/L	EPA 270.2	DC
TOTAL SILVER	<0.01	MG/L	EPA 272.1	DC
TOTAL ZINC	<0.02	MG/L	EPA 200.7	SR

Verified: *VF*

PPM - Parts/Million MG/L - Milligrams/Liter MC/KG - Milligrams/Kilogram
 PPB - Parts/Billion UG/L - Micrograms/Liter UG/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pico Curies/Liter

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8725759

Iowa City Laboratory
Oakdale Hall
Iowa City, IA 52242
(319) 335-4500

Des Moines Branch
900 East Grand
H.A. Wallace Building
Des Moines, IA 50319
(515) 281-5371

Date Received: 06/01/87

Date of Report: 06/22/87

Submitter: EPD 5
Address: WALLACE BLDG
City: DES MOINES, IA 50319

Sample Location: DM METRO EAST SLF
Date Collected: 05/29/87 14:35:00

Sample Description: WATER, CAMP CREEK
Client Reference: S GRGURICH

Comments:

DOWNSTREAM AT SE 44TH STREET, E OF RYNNELLS PRIOR TO RED ROCK
S_DT, COD, OC_T, CN_T, PHEN, TOT-HEAVY METALS.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
DISSOLVED SOLIDS	320 MG/L @180 C	EPA 140.1	JGT
CHEMICAL OXYGEN DMND	20 MG/L	EPA 410.1	JAG
TOTAL ORGANIC CARBON	4.3 MG/L	EPA 415.1	RWW
TOTAL CYANIDE	<0.01 MG/L	EPA 335.2	PH
PHENOLS (4AAP REAC.)	10 uG/L	EPA 420.2	RWW
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	DC
TOTAL BARIUM	0.18 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.02 MG/L	EPA 200.7	SR
TOTAL COPPER	<0.01 MG/L	EPA 220.1	DC
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	HL
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	DC
TOTAL SILVER	<0.01 MG/L	EPA 272.1	DC
TOTAL ZINC	0.06 MG/L	EPA 200.7	SR

Verified: *[Signature]*

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8757023

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 06/25/87

Date of Report: 07/14/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: METRO EAST SLF
 Date Collected: 06/24/87 10:40:00

Sample Description: WATER, SLF SAMPLE 01
 Client Reference: S. GRIGURICH

Comments

CAMP CREEK UPSTREAM, NORTH OF HWY 163.
 "DNR 5" LANDFILL PROJECT CODE TESTS.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
DISSOLVED SOLIDS	302 MG/L @180 C	EPA 140.1	SMH
CHEMICAL OXYGEN DEMD	16 MG/L	EPA 410.1	JAC
TOTAL ORGANIC CARBON	2.7 MG/L	EPA 415.1	RWW
TOTAL CYANIDE	<0.01 MG/L	EPA 335.2	PB
PHENOLS (4AAP REAC.)	<10 ug/L	EPA 420.2	RWW
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	ML
TOTAL BARIUM	0.15 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC
TOTAL COPPER	<0.01 MG/L	EPA 220.1	SMH
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	ML
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01 MG/L	EPA 272.1	ML
TOTAL ZINC	<0.02 MG/L	EPA 200.7	SR

Verified: 

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion ug/L - Micrograms/Liter ug/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pic Curies/Liter

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number: 8757024

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 06/23/87

Date of Report: 07/14/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: METRO EAST SLF
 Date Collected: 06/24/87 10:30:00

Sample Description: WATER, SLF SAMPLE 02
 Client Reference: S. GRGURICH

Comments

NORTH TRIBE TO CAMP CREEK NORTH OF HWY 143.
 "DNR 5" LANDFILL PROJECT CODE TESTS.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
DISSOLVED SOLIDS	354 MG/L @100 C	EPA 160.1	SMH
CHEMICAL OXYGEN DMND	12 MG/L	EPA 410.1	JAG
TOTAL ORGANIC CARBON	2.1 MG/L	EPA 415.1	RWV
TOTAL CYANIDE	<0.01 MG/L	EPA 335.2	PB
PHENOLS (4AAP REAC.)	<10 ug/L	EPA 420.2	RWV
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	ML
TOTAL BARIUM	0.22 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC
TOTAL COPPER	<0.01 MG/L	EPA 220.1	SMH
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	ML
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01 MG/L	EPA 272.1	ML
TOTAL ZINC	0.85 MG/L	EPA 200.7	SR

Verified: *JTF*

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion ug/L - Micrograms/Liter ug/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8757025

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 06/23/87

Date of Report: 07/14/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: METRO EAST SLF
 Date Collected: 06/14/87 11:00:00

Sample Description: WATER, SLF SAMPLE 03
 Client Reference: S. GOURICH

Comments

CAMP CREEK NORTH MIDDLE PRIOR TO JCT. OF NORTH TRIS.
 "DNR 5" LANDFILL PROJECT CODE TESTS.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
DISSOLVED SOLIDS	286 MG/L @180 C	EPA 160.1	SHM
CHEMICAL OXYGEN DEMD	20 MG/L	EPA 410.1	JAG
TOTAL ORGANIC CARBON	3.6 MG/L	EPA 415.1	RWW
TOTAL CYANIDE	<0.01 MG/L	EPA 335.2	PB
PHENOLS (4AAP REAC.)	<10 uG/L	EPA 420.2	RWW
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	HL
TOTAL BARIUM	0.16 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC
TOTAL COPPER	<0.01 MG/L	EPA 220.1	SHM
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	HL
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	HL
TOTAL SILVER	<0.01 MG/L	EPA 272.1	HL
TOTAL ZINC	<0.02 MG/L	EPA 200.7	SR

Verified: *LF*

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pico Curies/Liter

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8757024

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-3371

Date Received: 06/23/87

Date of Report: 07/14/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: METRO EAST SLF
 Date Collected: 06/24/87 10:30:00

Sample Description: WATER, SLF SAMPLE 04
 Client Reference: S. GRGURICH

Comments

NORTH TRIB. PRIOR TO JCT. TO CAMP CREEK.
 *DNR 5*LANDFILL PROJECT CODE TESTS.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
DISSOLVED SOLIDS	326 MG/L @180 C	EPA 160.1	SMM
CHEMICAL OXYGEN DMND	12 MG/L	EPA 410.1	JAC
TOTAL ORGANIC CARBON	2.3 MG/L	EPA 415.1	RWW
TOTAL CYANIDE	<0.01 MG/L	EPA 335.2	PE
PHENOLS (4AAP REAC.)	<10 UG/L	EPA 420.2	RWW
TOTAL ARSENIC	<0.01 MG/L	EPA 206.3	ML
TOTAL BARIUM	0.14 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC
TOTAL COPPER	<0.01 MG/L	EPA 220.1	SMM
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	ML
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01 MG/L	EPA 272.1	ML
TOTAL ZINC	<0.02 MG/L	EPA 200.7	SR

Verified: 

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion UG/L - Micrograms/Liter UG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8757027

Iowa City Laboratory
Oakdale Hall
Iowa City, IA 52242
(319) 355-4500

Des Moines Branch
900 East Grand
H.A. Wallace Building
Des Moines, IA 50319
(515) 281-5371

Date Received: 06/25/87

Date of Report: 07/14/87

Submitter: EPD 5
Address: WALLACE BLDG
City: DES MOINES, IA 50319

Sample Location: METRO EAST SLF
Date Collected: 06/24/87 12:30:00

Sample Description: WATER, SLF SAMPLE 05
Client Reference: S. GRONICH

Comments

SOUTH TRIB. PRIOR TO JCT. OF CAMP CREEK DOWNSTREAM.
"DNR 5" LANDFILL PROJECT CODE TESTS.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
DISSOLVED SOLIDS	226 MG/L @180 C	EPA 140.1	SHM
CHEMICAL OXYGEN DEMD	12 MG/L	EPA 410.1	JAG
TOTAL ORGANIC CARBON	3.2 MG/L	EPA 415.1	RWV
TOTAL CYANIDE	<0.01 MG/L	EPA 335.2	PE
PHENOLS (4AAP REAC.)	<10 uG/L	EPA 420.2	RWV
TOTAL ARSENIC	<0.01 MG/L	EPA 204.2	NL
TOTAL BARIUM	0.12 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC
TOTAL COPPER	<0.01 MG/L	EPA 220.1	SHM
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	NL
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	NL
TOTAL SILVER	<0.01 MG/L	EPA 272.1	NL
TOTAL ZINC	<0.02 MG/L	EPA 200.7	SR

Verified: *LF*

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8757028

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-3371

Date Received: 06/25/87

Date of Report: 07/14/87

Submitter: EPD 3
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: METRO EAST SLF
 Date Collected: 06/24/87 12:40:00

Sample Description: WATER, SLF SAMPLE 04
 Client Reference: S. GRGURICH

Comments

MIDDLE CAMP CREEK SOUTH OF JCT. OF SOUTH TRIN.
 "DNR 3" LANDFILL PROJECT CODE TESTS.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
DISSOLVED SOLIDS	298 MG/L @180 C	EPA 160.1	SMH
CHEMICAL OXYGEN DMND	16 MG/L	EPA 410.1	JAG
TOTAL ORGANIC CARBON	3.7 MG/L	EPA 410.1	RWW
TOTAL CYANIDE	<0.01 MG/L	EPA 430.2	FB
PHENOLS (4AAP REAC.)	<10 uG/L	EPA 420.2	RWW
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	ML
TOTAL BARIUM	0.16 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC
TOTAL COPPER	<0.01 MG/L	EPA 220.1	SMH
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	ML
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01 MG/L	EPA 272.1	ML
TOTAL ZINC	<0.02 MG/L	EPA 200.7	SR

Verified: *[Signature]*

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPS - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8757029

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 06/25/87

Date of Report: 07/14/87

Submitter: EPD 3
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: METRO EAST SLF
 Date Collected: 06/24/87 13:20:00

Sample Description: WATER, SLF SAMPLE 07
 Client Reference: S. GURICH

Comments

CAMP CREEK DOWNSTREAM AT S.E. 6TH.
 "DNR S" LANDFILL PROJECT CODE TESTS.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
DISSOLVED SOLIDS	314 MG/L @180 C	EPA 160.1	SMM
CHEMICAL OXYGEN DEMD	12 MG/L	EPA 410.1	JAC
TOTAL ORGANIC CARBON	3.6 MG/L	EPA 415.1	RWW
TOTAL CYANIDE	<0.01 MG/L	EPA 335.2	PB
PHENOLS (4AAP REAC.)	<10 ug/L	EPA 420.2	RWW
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	HL
TOTAL BARIUM	0.15 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC
TOTAL COPPER	<0.01 MG/L	EPA 220.1	SMM
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	HL
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	HL
TOTAL SILVER	<0.01 MG/L	EPA 272.1	HL
TOTAL ZINC	<0.02 MG/L	EPA 200.7	SR

Verified: 

PPM - Parts/Million
 PPB - Parts/Billion
 (- Less than

MG/L - Milligrams/Liter
 ug/L - Micrograms/Liter
) - Greater than

MG/KG - Milligrams/Kilogram
 ug/KG - Micrograms/Kilogram
 pCi/L - pico Curies/Liter

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8757030

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 06/25/87

Date of Report: 07/14/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: METRO EAST SLF
 Date Collected: 06/24/87 13:30:00

Sample Description: WATER, SLF SAMPLE 08
 Client Reference: S. GRGURICH

Comments

CAMP CREEK DOWNSTREAM AT S.E. MILLER DRIVE.
 "DNR 5" LANDFILL PROJECT CODE TESTS.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
DISSOLVED SOLIDS	274 MG/L @180 C	EPA 160.1	SMM
CHEMICAL OXYGEN DMND	12 MG/L	EPA 410.1	JAG
TOTAL ORGANIC CARBON	2.9 MG/L	EPA 415.1	RWW
TOTAL CYANIDE	<0.01 MG/L	EPA 335.2	PB
PHENOLS (4AAP REAC.)	<10 uG/L	EPA 420.2	RWW
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	ML
TOTAL BARIUM	0.16 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 210.2	DC
TOTAL COPPER	<0.01 MG/L	EPA 220.1	SMM
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	ML
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01 MG/L	EPA 272.1	ML
TOTAL ZINC	<0.02 MG/L	EPA 200.7	SR

Verified: *[Signature]*

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPS - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8757031

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 06/23/87

Date of Report: 07/14/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: METRO EAST SLF
 Date Collected: 06/24/87 13:45:00

Sample Description: WATER, SLF SAMPLE #9
 Client Reference: S. GRGURICH

Comments

CAMP CREEK DOWNSTREAM AT S. E. 64TH.
 *DNR 5-LANDFILL PROJECT CODE TESTS.

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
DISSOLVED SOLIDS	280 MG/L @180 C	EPA 140.1	SHM
CHEMICAL OXYGEN DEMAND	12 MG/L	EPA 410.1	JAG
TOTAL ORGANIC CARBON	3.7 MG/L	EPA 415.1	RWW
TOTAL CYANIDE	<0.01 MG/L	EPA 335.2	FB
PHENOLS (4AAP REAC.)	<10 ug/L	EPA 420.2	RWW
TOTAL ARSENIC	<0.01 MG/L	EPA 204.2	NL
TOTAL BARIUM	0.15 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC
TOTAL COPPER	<0.01 MG/L	EPA 220.1	SHM
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	NL
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	NL
TOTAL SILVER	<0.01 MG/L	EPA 272.1	NL
TOTAL ZINC	<0.02 MG/L	EPA 200.7	SR

Verified: *JH*

PFM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPS - Parts/Billion ug/L - Micrograms/Liter ug/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pice Curies/Liter

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8757997

Iowa City Laboratory
Oakdale Hall
Iowa City, IA 52242
(319) 335-4500

Des Moines Branch
900 East Grand
H.A. Wallace Building
Des Moines, IA 50319
(515) 281-5371

Date Received: 07/17/87

Date of Report: 07/28/87

Submitter: EPD 5
Address: WALLACE BLDG
City: DES MOINES, IA 50319

Sample Location: DES MOINES
Date Collected: 07/17/87 09:30:00

Sample Description: CREEK WATER
Client Reference: GRGURICH

Comments

METRO EAST SLP CAMP CREEK NORTH OF 163
DNR METRO EAST LANDFILL STUDY, SURFACE

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
DISSOLVED SOLIDS	400 MG/L @180 C	EPA 160.1	JGT
CHEMICAL OXYGEN DEMD	13 MG/L	EPA 410.1	JAG
TOTAL ORGANIC CARBON	3.3 MG/L	EPA 415.1	RWW
TOTAL CYANIDE	<0.01 MG/L	EPA 335.2	PB
PHENOLS (GAAP REAC.)	<10 uG/L	EPA 420.2	RWW
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	HL
TOTAL BARIUM	0.15 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC
TOTAL COPPER	<0.01 MG/L	EPA 220.1	HL
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	DC
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	HL
TOTAL SILVER	<0.01 MG/L	EPA 272.1	HL
TOTAL ZINC	0.03 MG/L	EPA 200.7	SR

Verified: *Laz*

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number J757998

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-3371

Date Received: 07/17/87

Date of Report: 07/28/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: DES MOINES
 Date Collected: 07/17/87 09:35:00

Sample Description: CREEK WATER
 Client Reference: GRGRICH

Comments

METRO EAST SLP NORTH TRIS TO CAMP CREEK NORTH OF 163
 DNR METRO EAST LANDFILL STUDY, SURFACE

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
DISSOLVED SOLIDS	410 MG/L @180 C	EPA 140.1	JGT
CHEMICAL OXYGEN DEMD	9 MG/L	EPA 410.1	JAC
TOTAL ORGANIC CARBON	3.0 MG/L	EPA 415.1	RWV
TOTAL CYANIDE	<0.01 MG/L	EPA 335.2	FR
PHENOLS (4AAP REAC.)	<10 ug/L	EPA 420.2	RWV
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	HL
TOTAL BARIUM	0.23 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC
TOTAL COPPER	<0.01 MG/L	EPA 220.1	HL
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	DC
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	HL
TOTAL SILVER	<0.01 MG/L	EPA 272.1	HL
TOTAL ZINC	0.05 MG/L	EPA 200.7	SR

Verified: *Lqj*

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion ug/L - Micrograms/Liter ug/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 0757999

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 07/17/87

Date of Report: 07/28/87

Submitter: EPD S
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: DES MOINES
 Date Collected: 07/17/87 09:45:00

Sample Description: CREEK WATER
 Client Reference: GRGURICH

Comments

METRO EAST SLF CAMP CREEK NORTH OF MIDDLE PRIOR TO JUNCTION
 OF NORTH TRIB. DMR METRO EAST LANDFILL STUDY, SURFACE

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
DISSOLVED SOLIDS	400 MG/L @180 C	EPA 160.1	JGT
CHEMICAL OXYGEN DEMD	10 MG/L	EPA 410.1	JAC
TOTAL ORGANIC CARBON	3.2 MG/L	EPA 415.1	RWW
TOTAL CYANIDE	<0.01 MG/L	EPA 335.2	FB
PHENOLS (4AAP REAC.)	<10 uG/L	EPA 420.2	RWW
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	ML
TOTAL BARIUM	0.15 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC
TOTAL COPPER	<0.01 MG/L	EPA 220.1	ML
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	ML
TOTAL NICKEL	<0.05 MG/L	EPA 260.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01 MG/L	EPA 272.1	ML
TOTAL ZINC	0.03 MG/L	EPA 280.7	SR

Verified: *Las*

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPH - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 0750000

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 700 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 07/17/87

Date of Report: 07/20/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: DES MOINES
 Date Collected: 07/17/87 09:50:00

Sample Description: CREEK WATER
 Client Reference: ORGURICH

Comments

METRO EAST SLP NORTH TRIS PRIOR TO JUNCTION TO CAMP CREEK
 DNR METRO EAST LANDFILL STUDY, SURFACE

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
DISSOLVED SOLIDS	370 MG/L @100 C	EPA 160.1	JGT
CHEMICAL OXYGEN DEMAND	9 MG/L	EPA 410.1	JAG
TOTAL ORGANIC CARBON	2.5 MG/L	EPA 415.1	RWW
TOTAL CYANIDE	<0.01 MG/L	EPA 335.2	PH
PHENOLS (4AAP REAC.)	<10 UG/L	EPA 420.2	RWW
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	ML
TOTAL BARIUM	0.16 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC
TOTAL COPPER	<0.01 MG/L	EPA 220.1	ML
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	DC
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01 MG/L	EPA 273.1	ML
TOTAL ZINC	0.03 MG/L	EPA 200.7	SR

Verified: *LJA*

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion UG/L - Micrograms/Liter UG/KG - Micrograms/Kilogram
 < - Less than > - Greater than PC/L - pico Curies/Liter

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8758001

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 07/17/87

Date of Report: 07/28/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES IA 50319

Sample Location: DES MOINES
 Date Collected: 07/17/87 11:00:00

Sample Description: CREEK WATER
 Client Reference: CRCURICH

Comments

METRO EAST SLF SOUTH TRIB PRIOR TO JUNCTION OF CAMP CREEK
 DOWNSTREAM. DNR METRO EAST LANDFILL STUDY, SURFACE

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
DISSOLVED SOLIDS	300 MG/L @180 C	EPA 160.1	JGT
CHEMICAL OXYGEN DMND	9 MG/L	EPA 410.1	JAG
TOTAL ORGANIC CARBON	2.7 MG/L	EPA 415.1	RWW
TOTAL CYANIDE	<0.01 MG/L	EPA 335.2	PH
PHENOLS (4AAP REAC.)	<10 uG/L	EPA 420.2	RWW
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	HL
TOTAL BARIUM	0.14 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC
TOTAL COPPER	<0.01 MG/L	EPA 220.1	HL
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	DC
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	HL
TOTAL SILVER	<0.01 MG/L	EPA 272.1	HL
TOTAL ZINC	0.03 MG/L	EPA 200.7	SR

Verified: *L93*

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pico Curies/Liter

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8758002

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4580

Des Moines Branch
 700 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 07/17/87

Date of Report: 07/28/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: DES MOINES
 Date Collected: 07/17/87 10:45:00

Sample Description: CREEK WATER
 Client Reference: GRGURICH

Comments

METRO EAST SLF MIDDLE CAMP CREEK SOUTH OF JUNCTION OF
 SOUTH TRIB. DNR METRO EAST LANDFILL STUDY, SURFACE

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
DISSOLVED SOLIDS	400 MG/L @180 C	EPA 140.1	JGT
CHEMICAL OXYGEN DMND	13 MG/L	EPA 410.1	JAG
TOTAL ORGANIC CARBON	3.8 MG/L	EPA 415.1	RW
TOTAL CYANIDE	<0.01 MG/L	EPA 335.2	FB
PHENOLS (4AAP REAC.)	<10 MG/L	EPA 420.2	RW
TOTAL ARSENIC	<0.01 MG/L	EPA 204.2	ML
TOTAL BARIUM	0.14 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC
TOTAL COPPER	<0.01 MG/L	EPA 220.1	ML
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	BC
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01 MG/L	EPA 272.1	ML
TOTAL ZINC	0.10 MG/L	EPA 200.7	SR

Verified: *LQJ*

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion µG/L - Micrograms/Liter µG/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pico Curies/Liter

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 0758003

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 07/17/87

Date of Report: 07/28/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: DES MOINES
 Date Collected: 07/17/87 12:20:00

Sample Description: CREEK WATER
 Client Reference: GRGURICH

Comments

METRO EAST SLF CAMP CREEK DOWNSTREAM OF S.E. 6TH
 DNR METRO EAST LANDFILL STUDY, SURFACE

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
DISSOLVED SOLIDS	390 MG/L @180 C	EPA 160.1	JGT
CHEMICAL OXYGEN DMND	13 MG/L	EPA 410.1	JAG
TOTAL ORGANIC CARBON	3.4 MG/L	EPA 415.1	RWW
TOTAL CYANIDE	<0.01 MG/L	EPA 335.2	FB
PHENOLS (4AAP REAC.)	<10 ug/L	EPA 420.2	RWW
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	ML
TOTAL BARIUM	0.15 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC
TOTAL COPPER	<0.01 MG/L	EPA 220.1	ML
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	BC
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01 MG/L	EPA 272.1	ML
TOTAL ZINC	0.05 MG/L	EPA 200.7	SR

Verified: *LAG*

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion ug/L - Micrograms/Liter ug/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pico Curies/Liter

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

 Analytical Report for Sample Number 8758004

Iowa City Laboratory
 Oakdale Hall
 Iowa City, IA 52242
 (319) 335-4500

Des Moines Branch
 900 East Grand
 H.A. Wallace Building
 Des Moines, IA 50319
 (515) 281-5371

Date Received: 07/17/87

Date of Report: 07/28/87

Submitter: EPD 5
 Address: WALLACE BLDG
 City: DES MOINES, IA 50319

Sample Location: DES MOINES
 Date Collected: 07/17/87 12:40:00

Sample Description: CREEK WATER
 Client Reference: GRGURICH

Comments

METRO EAST SLF CAMP CREEK AT S.E. MILLER DRIVE
 DNR METRO EAST LANDFILL STUDY, SURFACE

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
DISSOLVED SOLIDS	410 MG/L @180 C	EPA 160.1	JCT
CHEMICAL OXYGEN DEMD	13 MG/L	EPA 410.1	JAG
TOTAL ORGANIC CARBON	4.1 MG/L	EPA 415.1	RWV
TOTAL CYANIDE	<0.01 MG/L	EPA 335.2	FB
PHENOLS (4AAP REAC.)	<10 uG/L	EPA 420.2	RWV
TOTAL ARSENIC	<0.01 MG/L	EPA 204.2	ML
TOTAL BARIUM	0.14 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 210.2	DC
TOTAL COPPER	<0.01 MG/L	EPA 220.1	ML
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	DC
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01 MG/L	EPA 272.1	ML
TOTAL ZINC	0.04 MG/L	EPA 200.7	SR

Verified: *LQZ*

PPM - Parts/Million MG/L - Milligrams/Liter MG/KG - Milligrams/Kilogram
 PPB - Parts/Billion uG/L - Micrograms/Liter uG/KG - Micrograms/Kilogram
 (- Less than) - Greater than pCi/L - pice Curies/Liter

UNIVERSITY OF IOWA - HYGIENIC LABORATORY

Analytical Report for Sample Number 8758005

Iowa City Laboratory
Oakdale Hall
Iowa City, IA 52242
(319) 335-4500

Des Moines Branch
900 East Grand
H.A. Wallace Building
Des Moines, IA 50319
(515) 281-5371

Date Received: 07/17/87

Date of Report: 07/20/87

Submitter: EPD 5
Address: WALLACE BLDG
City: DES MOINES, IA 50319

Sample Location: DES MOINES
Date Collected: 07/17/87 01:10:00

Sample Description: CREEK WATER
Client Reference: ORGURICH

Comments

METRO EAST SLF CAMP CREEK DOWNSTREAM AT S.E. 64TH
DNR METRO EAST LANDFILL STUDY, SURFACE

--- Listing of Analyses Performed and Results ---

TEST	CONCENTRATION	METHOD USED	ANALYST
DISSOLVED SOLIDS	360 MG/L @180 C	EPA 160.1	JGT
CHEMICAL OXYGEN DMND	22 MG/L	EPA 410.1	JAG
TOTAL ORGANIC CARBON	3.7 MG/L	EPA 415.1	RWW
TOTAL CYANIDE	<0.01 MG/L	EPA 335.2	PE
PHENOLS (4AAP REAC.)	<10 UG/L	EPA 420.2	RWW
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	ML
TOTAL BARIUM	0.12 MG/L	EPA 200.7	SR
TOTAL CADMIUM	<0.001 MG/L	EPA 213.2	DC
TOTAL CHROMIUM	<0.01 MG/L	EPA 218.2	DC
TOTAL COPPER	<0.01 MG/L	EPA 220.1	ML
TOTAL LEAD	<0.01 MG/L	EPA 239.2	DC
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	DC
TOTAL NICKEL	<0.05 MG/L	EPA 200.7	SR
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	ML
TOTAL SILVER	<0.01 MG/L	EPA 272.1	ML
TOTAL ZINC	0.03 MG/L	EPA 200.7	SR

Verified: *LQJ*

PPM - Parts/Million MG/L - Milligrams/Liter MC/KG - Milligrams/Kilogram
 PPB - Parts/Billion UG/L - Micrograms/Liter UC/KG - Micrograms/Kilogram
 < - Less than > - Greater than pCi/L - pico Curies/Liter

APPENDIX G

WELL AND WELL SITE OBSERVATIONS

DES MOINES METRO LANDFILL

WELL 1 - DeGroot Farm

The DeGroot farm is one mile north of the landfill on NE 120th Street. This well is one foot east of the house next to the front door.

The well is a 48 inch, brick-lined, hand-dug well. The depth of the well is between 20 and 25 feet. The well extended less than 1 foot above the ground surface. The age of the well is unknown but is at least 57 years.

The area around the well is relatively flat but does slope away from the well. A septic tank is located about 57 feet south of the well; a lateral field, about 50 feet south of the well; a rock bed for the septic tank effluent, 125 feet south of the well; and an unused well, 83 feet east of the well.

The DeGroots are on rural water but the well water is used for miscellaneous household purposes (cleaning, laundry, plants).

WELL 2 - Vogelaar Farm

The Vogelaar farm is one-half mile west of the landfill entrance on Highway 163 (north side of the highway). This well is 150 feet north of the house.

The well is a bored well with the top ten feet constructed of 10 inch plastic pipe which ends at a concrete slab. The well then continues deeper with 3.5 foot diameter concrete tile. The depth of the well is 148 feet. This well is 4 years old.

Surface drainage in the well area is away from the well. The farm yard where livestock are kept is about 150 feet southeast of the well.

Mr. Vogelaar uses the water for drinking (after distilling it), regular household use, and for his cattle.

WELL 3A - Burdock Farm Shallow Well

The Burdock farm is about 0.9 mile west of the landfill entrance on Highway 163 (north side of highway). This well is about 50 feet south of the house.

This well is a 48 inch, brick-lined, hand-dug, hand-pump well. The depth of the well is between 25 and 30 feet. A concrete slab at the ground surface is the well platform. The age of the well is unknown but is over 20 years.

Surface drainage is away from the well. A septic tank is located 170 feet northwest of the well; a lateral field, 260 feet northwest of the well; and a hog confinement, 150 feet east of the well.

The water is used to water outdoor plants.

WELL 3B - Burdock Farm Deep Well

The Burdock farm is 0.9 mile west of the landfill entrance on Highway 163 (north side of the highway). This well is about 100 feet east southeast of the house.

This well is a 6 inch, steel, drilled well. The depth is 365 feet. The well is in a pit with a wooden cover. The age of the well is 20 years.

The area around the well is relatively flat but there is a gradual incline toward the well from the north. There is an unusable well 10 feet north of this well (about the same depth). A septic tank is about 245 feet west northwest of the well; a lateral field, 320 feet west northwest of the well; and a hog confinement, 50 feet east of the well.

The water is used for livestock.

WELL 4 - Hibbs Farm

The Hibbs farm is about 0.7 mile west of the landfill entrance on Highway 163 (south side of the highway). This well is about 50 feet south of the house.

This well is a 36 inch, concrete-tile lined, bored well. It is 37 feet deep. There is a concrete well cover. The age of the well is unknown.

Surface drainage from the east and southeast is toward the well. A septic tank is located 150 feet north of the well.

No one currently lives at this farm but the water would be used for drinking and regular household use.

WELL 5A - Danks Farm Deep Well

The Danks farm is on Highway 316 (east side of the highway) about one-half mile south of Highway 163. This is about one-half mile west of the landfill. The well is about 20 feet southeast of the house.

This well is a 6 inch, steel cased, drilled well. The well extends above the ground surface about 1 foot. The depth of the well is 320 feet. The well pit is adjacent and west of the well. The age of the well is 17 years.

Surface drainage is away from the well. A septic tank is located 75 feet north of the well; a hog confinement, 50 feet southwest of the well; and a barnyard, 50 feet east of the well.

This water is used for livestock.

WELL 5B - Danks Farm Shallow Barnyard Well

The Danks farm is on Highway 316 (east side of the highway) about one-half mile south of Highway 163. The well is about 250 feet northeast of the house.

The well is a 48 inch, brick-lined, hand-dug well. The depth of the well is 20 feet. The well extends about 2.5 feet above ground. The age of the well is 47 years.

Surface drainage is toward the well. The well is located in the barnyard where goats and sheep are kept. The septic tank is about 150 feet southwest of the well.

This water is used for livestock.

WELL 5C - Danks Farm Shallow Pasture Well

The Danks farm is on Highway 316 (east side of the highway) about one-half mile south of Highway 163. The well is about one-fourth mile east of the house in a pasture.

The well is a 30 inch, concrete-tile lined, bored well. It's depth is 30 feet. There is a windmill on top of it. The well cover is wooden planks. The original well was over 40 years old but the well was rebored and lined with concrete tile 20 to 25 years ago.

Surface drainage is toward the well, and the well is located in a cattle pasture.

This water is used for livestock.

WELL 6 - Kane Farm

The Kane farm is on Highway 316 (east side of the highway) about 0.8 mile south of Highway 163. The well is estimated to be several hundred feet north of the house and 200 feet south of a small drainage ditch.

The well is a 36 inch, concrete-tile lined, bored well. It is 35 to 36 feet deep. The concrete well platform is severely cracked. Several mice were observed when the wooden cover was lifted. The age of the well is unknown.

Surface drainage is toward the well. It is at the bottom of a hill and is located in a pasture.

The water is used for livestock.

WELL 7 - Lyle Gulling Farm

The Lyle Gulling farm is located on SE 6th Avenue (north side of the road) one-fourth mile east of Highway 316. This farm is about one-half mile southeast of the landfill. The well is about 0.2 mile east of the house in a field.

The well is a 36 inch, concrete-tile lined, bored well. It is 30 feet deep. The cover on the well is concrete. The grouting was in poor condition. The age of the well is approximately 20 years.

Surface drainage is toward the well from the west. The well is located in a corn field.

The Gullings are on rural water. This water is used for livestock.

WELL 8 - Sloan Farm

The Sloan farm is on SE 6th Avenue (north side of the road) about 0.6 mile east of Highway 316. This farm is about one-half mile south of the landfill. The well is 30 feet north of the road and fifty feet east of Camp Creek.

The well is a 36 inch, concrete-tile lined, bored well. It is 18 feet deep. The well cover is made of concrete. The age of the well is 20 years.

Surface drainage from the east moves toward the well. The septic tank and lateral field are 300 feet east of the well.

This water is used for watering outdoor plants.

WELL 9A - Blanch Gulling Farm House Well

The Blanch Gulling farm is on SE 6th Avenue (south side of the road) about 0.6 mile east of Highway 316. This well is about 65 feet east of the house.

The well is a 48 inch, brick-lined, hand-dug well. It is about 30 feet deep. The well platform was cracked. There is a concrete well cover. The age of the well is estimated at 100 years.

The area around the well was relatively flat. Livestock are kept 200 feet south of the well.

This water is used for drinking and all household purposes.

WELL 9B - Blanch Gulling Farm Pasture Well

The Blanch Gulling farm is on SE 6th Avenue (south side of the road) about 0.6 mile east of Highway 316. This well is 225 feet south of the house in a small wooden shed.

The well is a 36 inch, concrete-tile lined, bored well. It is 30 feet deep. There were mice in the well house. The age of the well is 30 years.

The area around the well is relatively flat but does slightly slope toward the well from the north. A pasture is just south of the well.

This water is used for livestock.

WELL 10 - Adkins Residence

The Adkins residence is on SE 6th Avenue (north side of the road) about 0.9 mile east of Highway 316. This farm is about one-half mile south of the landfill. The well is 170 feet northeast of the house.

The well is a 36 inch, concrete-tile lined, bored well. It is 33 feet deep. The well casing extends about 3 feet above the ground surface. There is a concrete well cover. The age of the well is 10 to 12 years.

Surface drainage from the northeast moves toward the well. A septic tank is located 120 feet west of the well.

This water is used for drinking and all other household needs.

WELL 11A - Gaas Farm Deep Well

The Gaas farm is on SE 6th Avenue (north side of road) one mile east of Highway 316. This farm is about one-half mile southeast of the landfill. The well is about 150 feet north northwest of the small house. (There are two houses.)

The well is a 6 inch, steel cased, drilled well. It is 325 feet deep. The well is in a brick-lined well pit and associated with a windmill. The well pit is covered with wooden planks. There were toads in the well pit. The age of the well is 44 years.

Surface drainage was away from the well. The well is located about four feet below the ground surface (in the well pit). A septic tank and lateral field are located about 200 feet southeast of the well and a barnyard is about 100 feet east of the well.

This water is used for livestock.

WELL 11B - Gaas Farm Shallow Well

The Gaas farm is on SE 5th Avenue (north side of road) one mile east of Highway 316. The well is 25 feet northeast of the small house.

The well is a 36 inch, brick-lined, hand dug well. It is 60 feet deep. There is a concrete slab at the ground surface and a metal well cover. The age of the well is estimated at 80 to 90 years.

The area around the well is relatively flat but there is a slight incline toward the well from the west. There is a septic tank and lateral field 80 feet southeast of the well and a feedlot 50 feet east of the well.

This water is used for drinking and other household purposes.

WELL 12 - Sampson Residence

The Sampson residence is on Highway 163 (south side of highway) less than one-fourth mile from the landfill entrance. The Sampson property borders the landfill. The well is 27 feet east of the house.

The well is a 6 inch, steel cased, drilled well. It is 280 feet deep. It has a steel cover. The age is unknown. The house was built in 1958.

Surface drainage is toward the well. There is a farm field 15 feet east of the well.

The water is used for watering outdoor plants.

WELL 13A - Wayne Miller Farm Shallow Well

The Wayne Miller farm is on Highway 316 (east side of the highway) about 1.9 miles south of Highway 163. The well is 700 feet northeast of the house.

The well is a 48 inch, brick-lined, hand-dug well. It is 15 feet deep. There is well pit connected with the well platform. The well pit drains into the well. The cover on the well is concrete and the cover on the pit is steel. The age of the well may be 100 years.

Surface drainage is toward the well. It is located in a heavily grazed pasture.

The water is used for drinking and regular household purposes.

WELL 13B - Wayne Miller Farm Deep Well

The Wayne Miller farm is on Highway 316 (east side of highway) about 1.9 miles south of Highway 163. The well is 150 feet east of the house.

The well is a 6 inch, steel cased, drilled well. It is 399 feet deep. The well extends about 2.5 feet above the ground surface and is inside a small wooden shed. The age of the well is 20 years.

The area around the well is flat. There is a septic tank 150 feet west of the well and a barnyard, 15 feet east of the well.

The water is used for livestock.

WELL 14 - Don Miller Farm

The Don Miller farm is located on SE Miller Drive about 0.9 mile east of Highway 316. The farm is about 2 miles south of the landfill. The well is one-fourth mile north of the house.

The well is a 36 inch, concrete-tile lined, bored well. It is 40 feet deep. There is a well pit adjacent to the well. The age of the well is unknown but is over 17 years. There is a concrete well cover.

Surface drainage is toward the well. The well is located in a pasture.

The well is used for drinking, household needs and livestock.

WELL 15A - Johnston Farm Shallow Hand Pump Well

The Johnston farm is on Highway 163 (north side of the road) about one-half mile east of the landfill entrance. The well is three feet east of the house.

The well is a brick-lined, hand-dug, hand pump well. It is 30 feet deep. The age of the well is unknown.

The area around the well is relatively flat. The septic tank is 115 feet west of the well. The barnyard is 200 feet east of the well.

This water is used to water outdoor plants and for the dog.

WELL 15B - Johnston Farm Deep Well

The Johnston farm is on Highway 163 (north side of the road) about one-half mile east of the landfill entrance. The well is about 200 feet east of the house in the barnyard.

The well is a 6 inch, steel cased, drilled well. It is 300 feet deep. The well is in the well pit. The age of the well is unknown.

The area around the well is relatively flat. The well is in the barnyard (hogs).

The water is used for livestock.

WELL 15C - Johnston Farm Field Well

The Johnston farm is on Highway 163 (north side of the road) about one-half mile east of the landfill entrance. The well is located in the field ravine 0.2 mile east and 300 feet north of the landfill entrance.

The well is a 48 inch, brick-lined, hand-dug well. It is 50 feet deep. It does not extend above the ground surface, and there is no cover on the well.

Surface drainage is to the well. The farm fields and highway 163 drain toward the well.

The water is not used.

WELL 16 - Soutter Farm

The Soutter farm is on NE 23rd Avenue (south side of the road) about a half mile west of NE 120th Street. This farm is about a mile north northwest of the landfill. The well is about 50 feet west of the house.

The well is a 6 inch, steel cased, drilled well. It is 239 feet deep. The well is in the well pit. The cover to the well pit is concrete-filled steel. The age of the well is about 30 years.

Surface drainage is away from the well. A septic tank and lateral field are 60 feet southeast of the well and the barnyard is 120 feet south of the well.

The water is used for livestock.

APPENDIX H

METRO LANDFILL AREA WELL SAMPLING

PRIVATE WELL CHARACTERISTICS

Well #	Construction	Casing	Depth	Age	Drainage	Water Usage
1	Hand Dug	Brick	20-25	57	Away	3,4
2	Bored	PVC/Conc. Tile	148	4	Away	1,2,3,4
3A	Hand Dug	Brick	25-30	over 20	Away	4
3B	Drilled	Steel	365	20	Toward	2
4	Bored	Concrete Tile	37	?	Toward	1,3
5A	Drilled	Steel	320	17	Away	2
5B	Hand-Dug	Brick	20	47	Toward	2
5C	Bored	Concrete Tile	30	40	Toward	2
6	Bored	Concrete Tile	35	?	Toward	2
7	Bored	Concrete Tile	30	20	Toward	2
8	Bored	Concrete Tile	18	20	Toward	4
9A	Hand Dug	Brick	30	100	Flat	1,3,4
9B	Bored	Concrete Tile	30	30	Toward	2
10	Bored	Concrete Tile	33	10-12	Toward	1,3,4
11A	Drilled	Steel	325	44	Away	2
11B	Hand Dug	Brick	60	80	Flat	1,3,4
12	Drilled	Steel	280	?	Toward	3
13A	Hand Dug	Brick	15	100	Toward	1,3,4
13B	Drilled	Steel	399	20	Flat	2
14	Bored	Concrete Tile	40	over 17	Toward	1,2,3,4
15A	Hand Dug	Brick	30	?	Flat	4
15B	Drilled	Steel	300	?	Toward	2
15C	Hand Dug	Brick	50	?	Toward	0
16	Drilled	Steel	239	20-25	Away	2

- 1 = Drinking Water
- 2 = Livestock
- 3 = Household Usage
- 4 = Outdoor Plants
- 0 = None

APPENDIX I

**IOWA SURFACE WATER QUALITY STANDARDS
CLASS B**

CONSTITUENT	LEVEL	
Arsenic	0.1	1
Barium	100	1
Cadmium in B(W) waters	0.01	1
Cadmium in B(C) waters	0.005	1
Chromium (total hexavalent)	0.05	1
Copper	0.05	1
Cyanide	0.05	1
Lead	0.05	1
Mercury	0.05	1
Phenols	0.05	1
Selenium	0.1	1
Total Residual Chlorine	2.5	1
Zinc	1.0	1
Ammonia Nitrogen (N)	B(W)	B(C)
November 1 to March 31	5mg/l	2.5mg/l
April 1 to October 31	2mg/l	1mg/l

APPENDIX J

METRO LANDFILL SURFACE WATER SAMPLING

DATE	MAY								
SAMPLING POINT	1	2	3	4	5	6	7	8	9
PARAMETER									
DIS. SOL. ID	370	350	370	390	290	360	360	330	320
CHEM. OX. DEMAND	8	8	16	8	20	12	12	12	20
T. ORG. CARBON	3.1	2.4	3.1	2.9	4	3.4	3.4	3.2	4.3
T. CYANIDE	*	*	*	*	*	*	*	*	*
PHENOLS	*	*	*	*	*	*	*	10	10
ARSENIC	*	*	*	*	*	*	*	*	*
BARIUM	0.14	0.22	0.16	0.18	0.14	0.16	0.16	0.16	0.18
CADMIUM	*	*	*	*	*	*	*	*	*
CHROMIUM	*	*	*	*	*	*	*	*	*
COPPER	0.03	*	0.01	*	0.01	*	*	0.02	*
LEAD	*	*	*	*	*	*	*	*	*
MERCURY	*	*	*	*	*	*	*	*	*
NICKEL	*	*	*	*	*	*	*	*	*
SELENIUM	*	*	*	*	*	*	*	*	*
SILVER	*	*	*	*	*	*	*	*	*
ZINC	0.12	0.03	0.08	0.05	0.07	0.04	0.04	*	0.06

DATE	JUNE								
SAMPLING POINT	1	2	3	4	5	6	7	8	9
PARAMETER									
DIS. SOL. ID	302	356	286	326	226	298	314	296	280
CHEM. OX. DEMAND	16	12	20	12	12	16	12	12	12
T. ORG. CARBON	2.7	2.1	3.6	2.3	3.2	3.7	3.6	2.9	3.7
T. CYANIDE	*	*	*	*	*	*	*	*	*
PHENOLS	*	*	*	*	*	*	*	*	*
ARSENIC	*	*	*	*	*	*	*	*	*
BARIUM	0.15	0.22	0.16	0.16	0.12	0.16	0.15	0.16	0.15
CADMIUM	*	*	*	*	*	*	*	*	*
CHROMIUM	*	*	*	*	*	*	*	*	*
COPPER	*	*	*	*	*	*	*	*	*
LEAD	*	*	*	*	*	*	*	*	*
MERCURY	*	*	*	*	*	*	*	*	*
NICKEL	*	*	*	*	*	*	*	*	*
SELENIUM	*	*	*	*	*	*	*	*	*
SILVER	*	*	*	*	*	*	*	*	*
ZINC	*	0.05	*	*	*	*	*	*	*

DATE SAMPLING POINT PARAMETER	JULY 1	JULY 2	JULY 3	JULY 4	JULY 5	JULY 6	JULY 7	JULY 8	JULY 9
DIS. SOLID	400	410	400	370	300	400	390	410	360
CHEM. OX. DEMAND	13	9	18	9	9	13	13	13	22
T. ORG. CARBON	3.3	3	3.2	2.5	2.7	3.8	3.4	4.1	3.7
T. CYANIDE	*	*	*	*	*	*	*	*	*
PHENOLS	*	*	*	*	*	*	*	*	*
ARSENIC	*	*	*	*	*	*	*	*	*
BARIUM	0.15	0.23	0.15	0.16	0.14	0.14	0.15	0.14	0.12
CADMIUM	*	*	*	*	*	*	*	*	*
CHROMIUM	*	*	*	*	*	*	*	*	*
COPPER	*	*	*	*	*	*	*	*	*
LEAD	*	*	*	*	*	*	*	*	*
MERCURY	*	*	*	*	*	*	*	*	*
NICKEL	*	*	*	*	*	*	*	*	*
SELENIUM	*	*	*	*	*	*	*	*	*
SILVER	*	*	*	*	*	*	*	*	*
ZINC	0.03	0.05	0.03	0.03	0.03	0.1	0.05	0.04	0.03

*BELOW
DETECTION

APPENDIX K

IOWA DEPARTMENT OF NATURAL RESOURCES
DRINKING WATER STANDARDS

State and federal laws governing public water supplies require suppliers of water to monitor for selected contaminants. To protect the public's health, drinking water standards have been established for the contaminants and characteristics indicated below.

MICROBIOLOGICAL MAXIMUM CONTAMINANT LEVELS					SURFACE WATER SYSTEMS ONLY
WHEN THE LAB TECHNIQUE USED IS -	WHEN LESS THAN 20 SAMPLES ARE EXAMINED PER MONTH, COLIFORM BACTERIA SHALL NOT -	WHEN 20 OR MORE SAMPLES ARE EXAMINED PER MONTH, COLIFORM BACTERIA SHALL NOT -	WHEN LESS THAN 5 SAMPLES ARE EXAMINED PER MONTH, COLIFORM BACTERIA SHALL NOT -	WHEN 5 OR MORE SAMPLES ARE EXAMINED PER MONTH, COLIFORM BACTERIA SHALL NOT -	
Membrane Filter	Exceed 4 bacteria per 100 ml in more than 1 sample.	Exceed 4 bacteria per 100 ml in more than 5% of the samples.			MAXIMUM CONTAMINANT LEVEL
Fermentation Tube & 10 ml Portions	Be present in 3 or more tubes in more than 1 sample.	Be present in 3 or more tubes in more than 5% of the samples.			Finished water shall be free of macroscopic organisms.
Fermentation Tube & 100 ml Portions			Be present in 5 tubes in more than 1 sample.	Be present in 5 tubes in more than 20% of the samples.	Algal cell count shall not exceed 500 organisms per ml or 10% of the total cells in the raw water.

CHEMICAL SUBSTANCES

INORGANIC CHEMICALS		ORGANIC CHEMICALS	
MAXIMUM CONTAMINANT LEVELS (CONCENTRATION IN MG/L)			
Arsenic	0.05	Lead	0.05
Barium	1.0	Mercury.....	0.002
Cadmium	0.010	Nitrate (as N)..	10.0
Chromium	0.05	Nitrate (as NO ₃)	45.0
Fluoride	2.2	Selenium.....	0.01
		Silver	0.05
		Sodium	No MCL
		Endrin.....	0.0002
		Lindane	0.004
		Methoxychlor	0.1
		Toxaphene	0.005
		2, 4-D.....	0.1
		2, 4, 5-TP Silvax	0.01
		Total Trihalomethanes .	0.10

RADIOACTIVITY		TURBIDITY (SURFACE WATER SYSTEMS ONLY)		CHARACTERISTICS	
ACTIVITY	MAXIMUM CONTAMINANT LEVELS	MAXIMUM CONTAMINANT LEVELS			
Gross Alpha Particle Activity	15 pCi/L**	1 TU/monthly average or 5 TU/day average		All community public water supplies must analyze their drinking water for the characteristics listed below to determine the corrosivity of their water.	
Combined radium 226 and 228	5 pCi/L**			pH Calcium hardness Total alkalinity Total dissolved solids Temperature	
Beta Particle & Photon Radioactivity (average annual concentration to body)	4 millirems/year			The corrosivity of the water is based upon a calculation of the Langelier Index or the Aggressive Index using the above information.	

** picocuries per liter

ENVIRONMENTAL PROTECTION AGENCY (EPA)
MAXIMUM CONTAMINANT LEVELS (MCL) FOR ORGANIC CHEMICALS
Effective 1989

Contaminant	Level
Benzene	0.005 mg/l
Carbon Tetrachloride	0.005 mg/l
1, 2-dichloroethane	0.005 mg/l
Trichloroethylene	0.005 mg/l
Para-dichlorobenzene	0.075 mg/l
1,1-dichloroethylene	0.007 mg/l
1,1,1-trichloroethane	0.20 mg/l
Vinyl Chloride	0.002 mg/l
Para-dichlorobenzene	0.075 mg/l*

*Established as a final maximum contaminant level goal (MCLG)

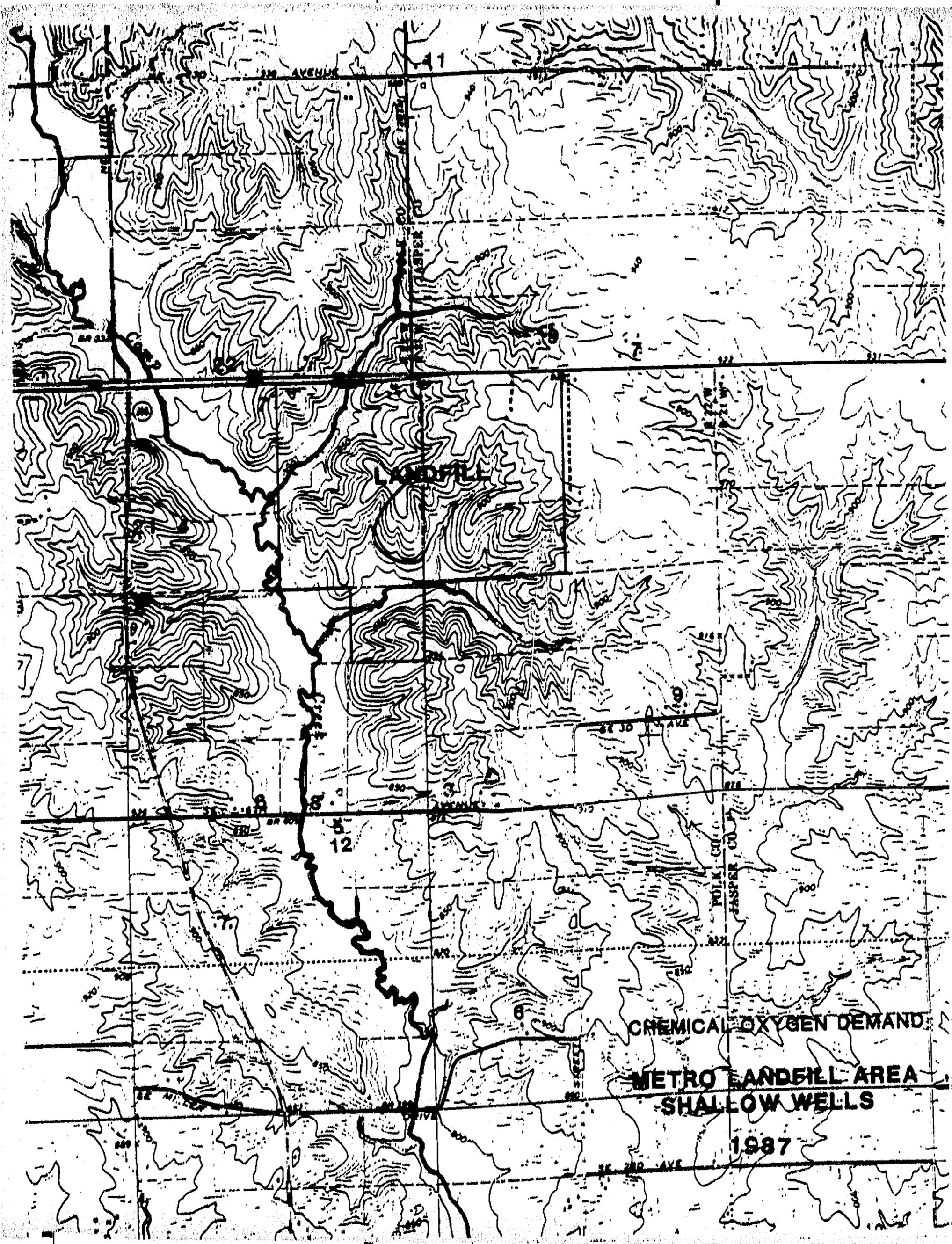
APPENDIX L

**NATIONAL SECONDARY
DRINKING WATER GUIDELINES***

CONTAMINANT	LEVEL
Chlorides	250 mg/l
Color	15 color units
Copper	1 mg/l
Corrosivity	Non-corrosive
Foaming agents	0.5 mg/l
Hydrogen sulfide	0.05 mg/l
Iron	0.3 mg/l
Manganese	0.05 mg/l
Odor	3 threshold odor number
pH	6.5-8.5
Sulfate	250 mg/l
Total dissolved solids	500 mg/l
Zinc	5 mg/l

*established to control contaminants that affect the aesthetic quality of drinking water (not related to health risks)

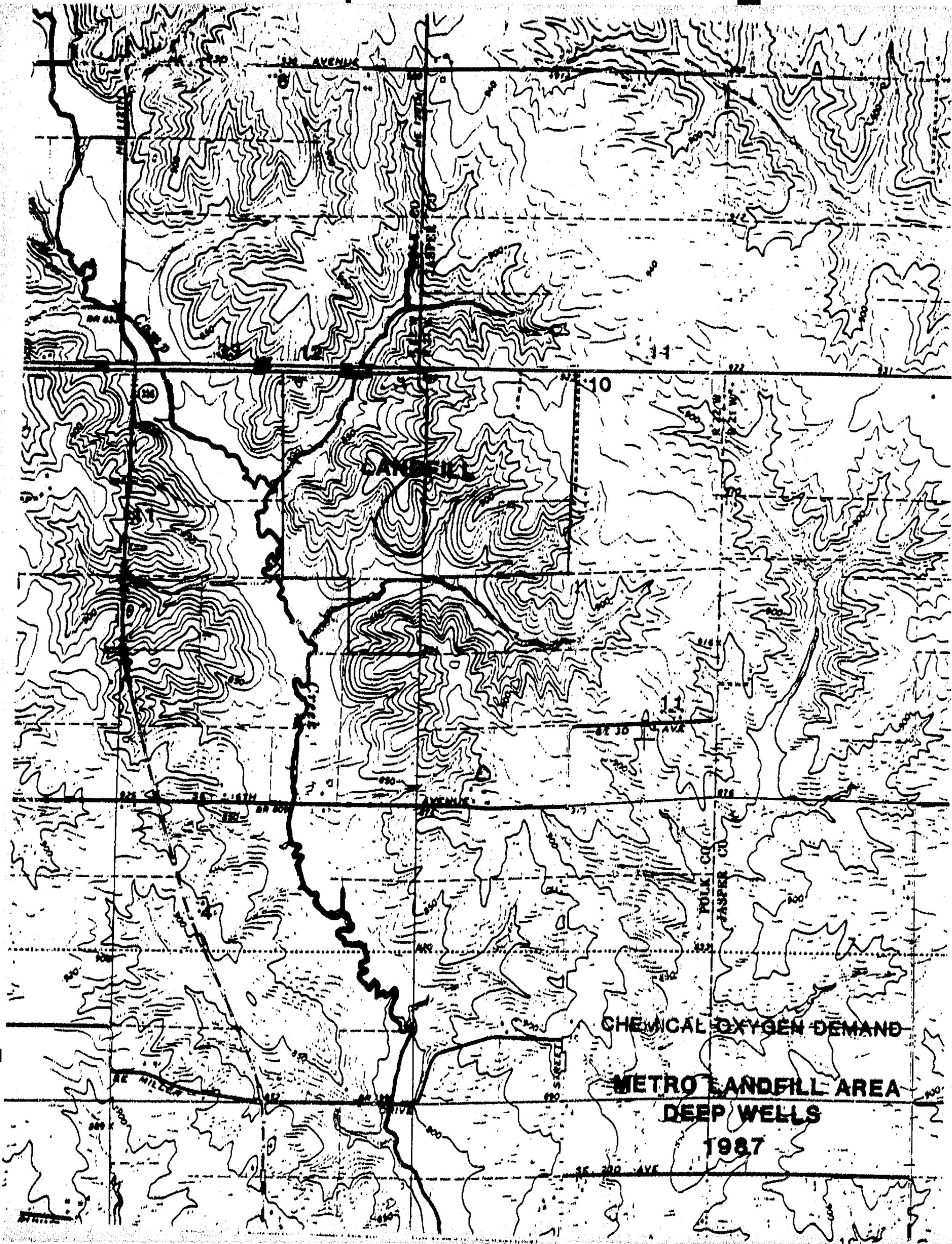
APPENDIX M



CHEMICAL OXYGEN DEMAND

METRO LANDFILL AREA
SHALLOW WELLS

1987



CHEMICAL OXYGEN DEMAND

METRO LANDFILL AREA
DEEP WELLS

1987

APPENDIX N

Selected Results From Metro Landfill Area Private Well Sampling May - July 1987
(mg/l)

PARAMETER	LOCATION	NITRATE	TRIBUTO METHANE**	TRICHLORO ETHANE	TOTAL DISSOLVED SOLIDS	SULFATES	CHLORIDES	CHEMICAL OXYGEN DEMAND	IRON	LEAD
STANDARD/ GUIDELINE	45	0.1	0.2	500	250	250	NONE	0.5	0.05	
WELL #										
1	DEGROOT	51-56	*	*	850-940	130-140	37-38	8-14	0-0.04	*
2	VOGELAAR	2-14	*	*	625-840	140-190	5-35	10-14	0.09-0.26	*
3A	BURDOCK	120	*	*	1660-1700	260-330	37-160	20	20-26	*
3B		*	0-0.002	*	850-1010	330-360	1.5-4.5	16-66	2.3-14	*
4	HIBBS	*	*	*	400-440	36-41	9-14	4-14	0.58-2.7	*
5A	DANKS	0-9.8	*	*	790-3500	130-2200	50-73	8-17	0.24-16	*
5B		0-15	*	*	580-3500	140-2100	44-64	10-24	0.11-13	*
5C		0.2-7.6	*	*	200-280	28-30	1-8	3-6	0.18-0.26	*
6	KANE	0-0.1	*	*	320-350	36-46	11-13	3-13	0.2-1.7	*
7	L GULLING	6.3-15	*	*	390-400	76-84	24-27	4-8	0.02-0.03	*
8	SLOAN	5.9-6.2	*	0-0.001	220-260	39-46	22-26	4-12	0-0.26	*
9A	B GULLING	7.3-7.5	*	*	280-300	50-60	7-8	3-9	0-0.02	*
9B		23-26	*	*	490-500	71-91	44-48	6-22	0.01-0.86	8
10	ADKINS	18-21	*	*	300-330	22-28	15-16	0-4	0-0.05	*
11A	GAAS	0-0.8	*	*	1150-1180	600-640	3-4	8-14	2-29	*
11B		9.5-17	0.001-0.030	*	380-750	110-240	16-32	4-14	0.03-0.27	0-0.01
12	SAMPSON	*	*	*	1070-1360	480-760	7-12	7-12	9.7-21	0-0.06
13A	W MILLER	16-18	*	*	470-510	60-63	14-76	4-13	0-0.12	*
13B		0-0.5	*	*	2180-2200	1100-1300	66-97	4	2.3-14	*
14	D MILLER	40-43	*	*	650-660	68-85	50-53	0-9	0-0.05	*
15A	JOHNSTON	20-21	*	*	560-570	66-78	39-48	4-10	0.19-0.39	*
15B		0-0.4	*	*	720-830	150-300	9.5-65	8-14	2.5-3.6	0-0.01
15C		4.2-6.3	*	*	240-310	27-29	18-23	4-18	0.02-0.21	*
16	SOOTER	*	*	*	1350-1380	610-710	4-7	0-14	2.7-3.4	*

*Below Detection Limit

**Includes Chloroform, Dibromochloromethane, Bromodichloromethane, and Bromoform

ENVIRONMENTAL PROTECTION COMMISSION

ITEM

9

INFORMATION

SURCHARGES AND SANITARY LANDFILLS

The staff will answer several questions that were posed at the last Commission meeting.

Pete Hamlin
October 30, 1987

(127.MIN/sc)

ENVIRONMENTAL PROTECTION COMMISSION

ITEM 10

INFORMATION

GRA-IRON FOUNDRY

The situation regarding the GRA-Iron Foundry will be discussed. This facility went into bankruptcy and left various kinds of wastes on the site. It is being investigated as a possible Superfund site.

Pete Hamlin
October 30, 1987

(128.MIN/sc)

ENVIRONMENTAL PROTECTION COMMISSION

ITEM 11

INFORMATION

NOTICE OF REPORT AVAILABILITY--PESTICIDES IN WATER SUPPLIES USING SURFACE WATER SOURCES

A report entitled "Pesticides in Water Supplies Using Surface Water Sources" has been prepared by the University Hygienic Laboratory and DNR staff. The report presents the findings of a special study on pesticides conducted in 1986 as a cooperative effort between the UHL and the department. Copies of the report will be provided to the Commission and a brief summary of the content of the report will be presented.

Monica Wnuk
October 28, 1987

(I21.MIN/sc)

**PESTICIDES IN WATER SUPPLIES
USING SURFACE WATER SOURCES**



IOWA DEPARTMENT OF NATURAL RESOURCES
Wallace State Office Building
Des Moines, Iowa 50319

**Pesticides in Water Supplies
Using Surface Water Sources**

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and

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September 1987

The publication of this document has been funded by the University Hygienic Laboratory in Iowa City, Iowa, and, the Department of Natural Resources through a grant from the United States Environmental Protection Agency.

Summary

A study was undertaken in the spring of 1986 by the Iowa Department of Natural Resources and the University Hygienic Lab to investigate pesticide contamination in water supplies using surface water sources. Samples of treated water were collected from 33 public water supplies which rely on a surface water as their sole source or as one of several permanent sources of water. All samples were collected after a rainfall event and thus represented pesticide levels in treated water affected by runoff. At 14 of these public water supplies, concurrent samples were also collected from the surface water source, prior to treatment. Sampling of water prior to and after treatment provided an indication of the effectiveness of pesticide removal during the treatment process. Each sample was analyzed for 37 pesticide compounds.

Of the 33 public water supplies tested, detectable levels of one or more pesticide compounds were found in 30 of the supplies. Individual pesticides and the number of supplies in which they were detected were: atrazine, 30; cyanazine (Bladex), 26; metolachlor (Dual), 21; alachlor (Lasso), 17; carbofuran (Furadan), 9; metribuzin (Sencor), 4; 2,4-D, 2; and, trifluralin (Treflan), butylate (Sutan) and dicamba (Banvel), 1 each. Overall in the treated water samples, ten individual pesticide compounds were detected out of the 37 analyzed.

All the pesticides detected in the treated water samples are identified as those most abundantly used on cropland. With the exception of 2,4-D, the pesticide compounds found at the public water supplies tested in this study are not required to be monitored through the federal requirements in the Safe Drinking Water Act (SDWA). In total, the SDWA only requires monitoring for six pesticide compounds in public water supplies using surface water sources. Of those required to be monitored only 2,4-D was detected in the treated water samples. The remaining pesticides, mandated to be monitored according to SDWA regulations, have limited or no current usage in Iowa.

Results from samples collected prior to and after treatment indicate that conventional water treatment systems are ineffective at substantially removing or eliminating pesticide compounds. Thirteen of 14 water supplies sampling both treated and untreated water had detectable levels of pesticide compounds in the untreated source water. All 13 of these supplies had detectable levels of one or more pesticide compound in their respective treated water samples. Although the water supplies tested provided results from a wide range of conventional treatment systems, evaluating the effectiveness of any one type of treatment system was beyond the scope of this study.

Pesticide concentrations in treated water at 21 of the 33 water supplies tested exceeded preliminary lifetime health advisory concentrations (MCL Goals). Although samples were collected after a rainfall-runoff event, the amounts of rainfall received and occurrence with respect to pesticide application varied among the water supplies tested. Due to these factors, as well as a number of others, neither the frequency or magnitude of pesticide contamination at these water supplies can be ascertained from this study. Concurrently, the frequency at which the lifetime health advisory concentrations in those water supplies is exceeded cannot be established.

The findings from this study support the following recommendations:

- commonly used pesticides should be monitored in public water supplies on a regular basis;
- there should be an increased public awareness of the presence of unregulated contaminants in drinking water;
- changes to the Safe Drinking Water Act should be supported to reflect current pesticide usage; and,
- the prevention of surface water contamination through more efficient chemical usage should be emphasized.

Table of Contents

	<u>Page</u>
Abstract	1
Glossary	ii
I. Introduction	1
A. Study Objectives	1
B. Water Supplies Participating in the Study	1
C. Pesticides Selected for Analysis	4
D. Pesticide Monitoring Requirements for Water Supplies	4
E. Previous Pesticide Monitoring	6
F. Statewide Pesticide Usage	10
G. Surface Supply Treatment Methods	11
II. Methodology	14
A. Sampling Methods	14
B. Analytical Methods	14
III. Results and Discussion	15
A. General Data Assessment	15
B. Treatment Effectiveness	17
C. Comparison of the Findings with Required Pesticide Monitoring	18
D. Health Impacts	20
E. Factors Affecting the Study Results	22
F. Comparison of Results with Previous Monitoring	23
IV. Conclusions and Recommendations	24
References	26
Table 1 - Water Supplies Sampled	2
Table 2 - Pesticide Compounds Analyzed in the Samples	5
Table 3 - Maximum Contaminant Levels for Pesticides	6
Table 4 - Monsanto's 1985-1986 Study Results	9
Table 5 - Major Pesticides Applied to Iowa Cropland	11
Table 6 - Usage of SDWA Required Monitoring Pesticides	12
Table 7 - Treatment Methods Used by Water Supplies	13
Table 8 - Occurrence of Positive Pesticide Detections	16
Table 9 - Occurrence of Detectable Pesticide Compounds in Treated Water Samples	16
Table 10 - Range of Detected Pesticide Concentrations and Mean Value	17
Table 11 - Analytical Results Comparing Treated and Untreated Water Samples	19
Table 12 - Preliminary Health Advisory Levels	21
Table 13 - Statewide Planting Statistics	23

Table of Contents
- Continued -

	<u>Page</u>
Figure 1 - Distribution of Facilities	3
Figure 2 - UHL Monitoring Results	8
Appendix I - Analytical Results	28
Appendix II - Sample Collection Information Provided by Sample Collectors .	31
Appendix III - Toxicity Information	32

Abstract

Between May and early July in 1986, samples of treated (finished) water were collected after rainfall from 33 public water supplies using surface water sources. These samples were analyzed for 37 pesticide compounds. Fourteen water supplies also collected samples from their surface water source prior to treatment to determine the effectiveness of treatment with regard to pesticide removal.

Detectable concentrations of one or more of ten pesticides were found in the treated water from 30 of the 33 water supplies tested. Individual pesticides and the number of supplies in which they were detected were: atrazine, 30; cyanazine (Bladex), 26; metolachlor (Dual), 21; alachlor (Lasso), 17; carbofuran (Furadan), 9; metribuzin (Sencor), 4; 2,4-D, 2; and, trifluralin (Treflan), butylate (Sutan) and dicamba (Banvel), 1 each.

Study results indicate that current conventional water treatment technology is ineffective at substantial reduction of pesticide concentrations or elimination of pesticides from drinking water. Further, the study suggests that current pesticide monitoring requirements of the Safe Drinking Water Act are inadequate.

GLOSSARY

"Community water system" means a public water supply system which has at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents.

"Detection limit" means the lowest concentration which gives an instrument response distinguishable from instrument/background "noise". This limit will not normally have a value assigned as it will vary from day to day depending on instrument response and sample matrices. The analyst will make an experienced judgement regarding the presence of a compound based on the instrument response, background, sample matrix, etc. for the sample in question.

"Maximum contaminant level" (MCL) means the maximum permissible level of a contaminant in water which is delivered to the free flowing outlet of the ultimate user of a public water supply system, except in the case of turbidity where the maximum permissible level is measured at the point of entry to the distribution system. Contaminants added to the water under circumstances controlled by the user, except those resulting from corrosion of piping and plumbing caused by water quality, are excluded from this definition.

"Public water supply system" means a system for the provision to the public of piped water for human consumption, if such system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year. Such terms include: 1) any collection, treatment, storage and distribution facilities under control of the supplier of water and used primarily in connection with such system, and 2) any collection (including wells) or pretreatment storage facilities not under such control which are used primarily in connection with such system. A public water supply system is either a "community water system" or a "noncommunity water system".

I. Introduction

A. Study Objectives

In 1986, the University Hygienic Laboratory (UHL) and the Iowa Department of Natural Resources (DNR) conducted a study on public drinking water supplies throughout the state that utilize surface water (e.g., rivers, lakes, reservoirs) as a water source. This study was conducted in the late spring and early summer of 1986. All samples were collected following rainfall-runoff. Therefore, the sampling protocol was designed to study a "worst case" situation.

The primary objective of this study was to determine if pesticides were present in these drinking water supplies. Previous monitoring (Johnson and Splinter, 1983) had shown that detectable concentrations of pesticides were found at selected water supply intakes using surface water sources. With the heavy pesticide usage throughout Iowa (Wintersteen and Hartzler, 1986), this 1986 study attempted to determine how prevalent pesticides were in drinking water supplies using surface water sources and to assess what types of surface water sources were more susceptible to pesticide contamination.

A secondary objective of this study was to examine treatment effectiveness for removal of pesticides. At selected water supplies, a sample was collected of the untreated water (at the intake) followed with a sample of treated water after allowing adequate time for treatment processing. Comparison of the concentrations of pesticides found in the treated sample with the untreated sample should indicate the effectiveness of treatment upon pesticide removal.

The Safe Drinking Water Act (SDWA) does not require water supplies to monitor for most of the pesticides currently being used. Sampling under an assumed "worst case" scenario was performed to provide information to assess the potential of contamination in drinking water supplies from a wide spectrum of the pesticide compounds currently being used.

B. Water Supplies Participating in the Study

While the majority of Iowa's drinking water is obtained from ground water sources, there are 52 community public water supplies which utilize surface water as their sole source, as a partial source to blend with other permanent sources, or, as an emergency source. Thirty-eight of these 52 community public water supplies were asked by DNR to participate in the study. Samples were received from the 34 water supplies listed in Table 1. A listing of the individual facilities participating in the study, the population served by the water facility, the surface source used and the facility's dependency upon the surface source are identified and included in Table 1.

Selection of those supplies participating in the study was based primarily on obtaining a statewide representation. On major rivers, except the Mississippi River, only one facility was generally selected. A map showing the statewide distribution of facilities participating in this study is provided in Figure 1. As evident in Figure 1, the

TABLE 1

Water Supplies Sampled

Water Supply	Population Served By Supply	Surface Source Sampled	Number and Type of Available Water Sources	
			Surface	Ground Water
Afton	985	Afton West Lake	1-P	
*Albia	4,184	Reservoir	1-P,1-E	1-E
*Bedford	1,692	Scane Lake	2-P	
**Bloomfield	3,061	Lake Fisher	1-P,1-I	
Burlington	31,451	Mississippi River	1-P	
Central Water System	1,610	West Lake Okoboji	1-P	
*Clarinda	9,467	Nodaway River	1-P,1-E	
Clear Lake	7,458	Clear Lake	1-P	1-P
Corydon	1,818	Corydon Lake	1-P,1-I	
*Council Bluffs	56,699	Missouri River	1-P	1-E
Creston	8,429	Twelve Mile Reservoir	2-P	
*Davenport	134,975	Mississippi River	1-P	
*Des Moines	234,027	Des Moines River	2-P	1-P
Fairfield	10,964	Walton Reservoir	1-P	2-E
*Fort Madison	13,520	Mississippi River	1-P	2-P
Greenfield	2,243	Lake Greenfield	2-P	
*Hrmeston	671	Reservoir	1-P	
Keokuk	13,536	Mississippi River	1-P	
Lake Park	1,123	Silver Lake	1-P	
*Lakeview Heights Homeowners Assn.	140	Reservoir	1-P	
Lewoni	2,705	Home Pond	2-P	
Lenox	1,338	Maharry's Lake	3-P	
Montezuma	1,683	Diamond Lake	1-P	
Mount Ayr	1,938	Lake Ayr	1-P	
Mount Pleasant	7,372	Skunk River	1-P	2-P
*Orient	416	Lake Orient	1-P	
Osceola	4,000	West Lake	1-P	
*Ottumwa	31,891	Des Moines River	1-P	
*Panora	1,211	Middle Raccoon River	1-P	
*Rathbun RWA	15,390	Lake Rathbun	1-P	
Spirit Lake	4,522	Spirit Lake	1-P	
Sun Valley RWA	720	Sun Valley Lake	1-P	
*University of Iowa	20,000	Iowa River	1-P,1-E	
Winterset	4,021	Cedar Lake	1-P	1-P

*Indicates systems where both treated and untreated water samples were collected. All other water supplies sampled only treated (finished) water except **.
 **Sampled untreated (raw) water only.

Source Type Code
 P = permanent
 E = emergency
 I = interim

^aPermanent but used only when needed.

majority of public water supplies using surface water sources are located in southern Iowa. Ground water of good quality is generally not available in southern Iowa and the general topography is suitable for constructing surface water impoundments.

All supplies participating in the study were requested to collect a sample of their treated water that would have been affected by rainfall-runoff. Fourteen of these supplies also provided a sample of the intake water prior to treatment so that pesticide removal could be determined by comparing the sample results. Selection of the supplies providing both untreated and treated samples was based on obtaining a representation of differing treatment systems.

C. Pesticides Selected For Analysis

All samples submitted as part of this study were analyzed by the University Hygienic Laboratory (UHL) for 37 pesticide compounds. These compounds, pesticides or their breakdown products, are listed in Table 2 along with each compound's detection limit. Selection of pesticide compounds for analysis was based on the following considerations:

- includes all pesticides required to be monitored by surface water supplies pursuant to the federal Safe Drinking Water Act (SDWA) with the exception of methoxychlor;
- based on usage data, this list of pesticides has the greatest potential of being found in Iowa surface waters; and,
- allows for a comparison of the results of this study with previous surface and ground water studies.

D. Pesticide Monitoring Requirements for Water Supplies

The Department of Natural Resources (DNR) administers Iowa's public water supply program. Iowa's public water supply program is consistent with the requirements in the federal Safe Drinking Water Act (SDWA). Drinking water standards, including maximum contaminant levels (MCLs), and monitoring requirements imposed in Iowa's administrative rules on public water supplies are based on SDWA requirements. DNR's regulatory authority over private water supplies in the state only applies to minimum location and construction standards. Thus, there are no DNR monitoring requirements of private water supplies in Iowa.

Only six pesticides are required to be monitored under the federal SDWA requirements. The MCLs for these six pesticides which are applicable to all community public water supplies are presented below in Table 3.

TABLE 2

Pesticide Compounds Analyzed in the Samples

Compound*	Detection Limit (ug/l)
Aldrin (HHDN)	0.04
alpha-BHC (α Benzene Hexachloride)	0.04
beta-BHC (β Benzene Hexachloride)	0.04
delta-BHC (δ Benzene Hexachloride)	0.04
gamma-BHC (Lindane)	0.04
Chlordane	0.2
DDD (TDE)	0.04
DDE	0.04
DDT (Dichlorodiphenyltrichloroethane)	0.04
Dieldrin (HEOD)	0.04
Endosulfan I (Thiodan I)	0.04
Endosulfan II (Thiodan II)	0.04
Endosulfan Sulfate	0.04
Endrin (Endrex)	0.04
Endrin aldehyde	0.04
Heptachlor	0.04
Heptachlor Epoxide	0.04
Polychlorocamphene (Toxaphene)	0.5
Fonofos (Dyfonate)	0.1
Terbufos (Counter)	0.1
Chlorpyrifos (Lorsban)	0.1
Phorate (Thimet)	0.1
Ethoprop (McCap)	0.1
AAtrex (Atrazine)	0.1
Cyanazine (Bladax)	0.1
Alachlor (Lasso)	0.1
Trifluralin (Treflan)	0.1
Metribuzin (Sencor)	0.1
Metolachlor (Dual)	0.1
Chloramben (Amiben)	0.1
Dicamba (Banvel)	0.1
2,4-D	0.1
2,4,5-TP (Silvex)	0.1
Butylate (Sutan)	0.1
Carbofuran (Furadan)	0.1
Sulprofos (Bolstar)	0.1
Terbufos sulfone	0.1

*Common trade name given in parenthesis

All community public water supplies utilizing surface water sources are required to monitor for those pesticides listed in Table 3, at a minimum, once every three years. According to state regulations, treated water samples are to be collected during the period of the year designated by DNR as the period when contamination by pesticides is most likely to occur. DNR has designated the months of April, May and June as the sampling period for required pesticide monitoring. If the pesticide level in treated water exceeds the MCL, the supplier of water would, at the least, be required to perform additional, more frequent monitoring.

TABLE 3

Maximum Contaminant Levels for Pesticides

Compound	MCL (mg/l)
Endrin	0.0002
Lindane	0.004
Methoxychlor	0.1
Toxaphene	0.005
2,4-D	0.1
2,4,5-TP (Silvex)	0.01

The DNR also has the authority to require monitoring for other pesticides in addition to those contained in Table 3. 563--41.4(15) of the Iowa Administrative Code contains the following provision:

"41.4(15) If the department determines that other contaminants are present in a public water supply, and the contaminants are known to pose or scientific evidence strongly suggests that they pose a threat to human health, the supplier of water is to monitor for such contaminants.".....

At the time of this study, none of the water supplies that were sampled were required to monitor for any other pesticides than the six required by the SDWA regulations, and none were required to sample more frequently than once every three years.

E. Previous Pesticide Monitoring

The monitoring of pesticides in surface and ground waters has become of recent importance. An increased occurrence in the detection of pesticides and concern for public health from the use of water contaminated with one or more pesticides have led to an increased emphasis for pesticide monitoring. Several previous pesticide

monitoring efforts in Iowa have indicated that drinking water supplies are being contaminated by commonly used pesticides. A brief review of previous monitoring efforts in Iowa is contained below. The results of these studies provide insight into the extent of pesticide contamination in the state's ground and surface waters, and, the effectiveness of water supply treatment in removing pesticides.

UHL Monitoring

Between 1968 and 1982, the UHL monitored pesticides in 12 different surface waters near public water supply intakes (Johnson and Splinter, 1983). Monitoring was initiated because of concerns with chlorinated hydrocarbon insecticide compounds such as DDT, dieldrin and DDE. Monthly samples were collected by the water supply operators. Thus, samples should be representative of varying flow regimes experienced throughout the year.

A thorough analysis of the data has not yet been completed, but Figure 2 provides an overview of the results (Kelley et al., 1986). Data on the now-banned pesticides dieldrin and DDT and its by-product DDE go back to 1968. Over time, residues of DDT and DDE were detected less frequently, and by 1981 samples seldom contained detectable residues. Dieldrin, on the other hand, continued to appear in about 35-40% of the samples. Dieldrin has a very strong affinity to attach to soil particles (clay, organic matter, colloids) and its appearance was typically related to some turbidity, and the concentrations were very low (less than 10 parts per trillion).

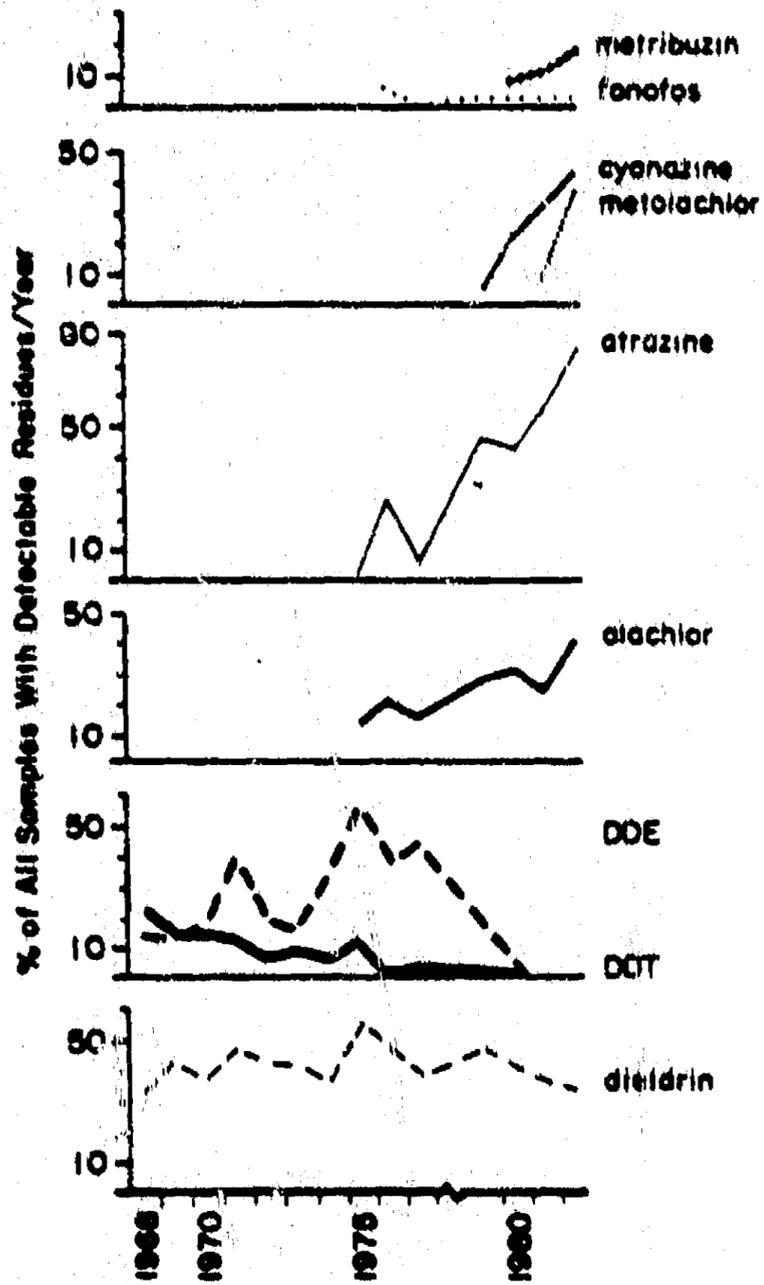
In 1975, UHL modified procedures and began analyzing for the more "modern" pesticides which came into use. Although some changes in methods took place after 1975, detection limits remained nearly the same, and the trends shown are not the result of more sensitive testing methods. For all the modern herbicides, the trend is the same (Figure 2). All increase in their occurrence with time; e.g., atrazine to nearly 80% by 1982, alachlor (Lasso) and cyanazine (Bladex) to 40-50%. By 1980, at some sampling stations, a number of the herbicides were present even in winter base-flow samples.

Iowa State University Study

In 1974, a study was undertaken to examine the presence of the pesticides atrazine, DDE and dieldrin in surface, subsurface (shallow alluvial) and finished drinking waters in the State of Iowa (Richard et al., 1974). The study found that every major watershed revealed some degree of pesticide contamination and that seasonal variations existed. Atrazine, DDE and dieldrin were found in most of the water samples tested. Pesticide contamination generally was found to exist in all waters which originated from the shallow wells in the alluvial plains of contaminated rivers and in all finished waters that originated from either surface waters or shallow wells. In examining treatment removal of pesticides at several finished (treated) water supplies, the study demonstrated that the water treatment processes currently used by the supplies monitored were ineffective at reducing or eliminating these pesticides from the water; this included treatment with activated carbon.

Figure 2. UHL Monitoring Results

Percent of All Samples Per Year Which Had Detectable Pesticide Residues, From Monthly Sampling of 12 Surface Water Sites in Iowa vs. Time.



Monsanto Study

Between May 1985 and March 1986, untreated and treated samples were collected approximately weekly from the Clarinda, Davenport and University of Iowa community public water supply systems (Monsanto, 1986a). Samples were analyzed by the Monsanto Company for the following pesticides: atrazine, alachlor (Lasso), cyanazine (Bladex), linuron, metolachlor (Dual), metribuzin (Sencor), simazine and trifluralin (Treflan). A summary of the results from this study is presented in Table 4. By comparing the results of untreated and treated samples, Monsanto concluded that conventional water treatment was not effective at removing alachlor (Monsanto, 1986b). Utilizing the same approach, the data generated in the study also showed that conventional water treatment was ineffective at removing atrazine, cyanazine and metolachlor.

TABLE 4

Monsanto's 1985-1986 Study Results
Frequency of Positive Pesticide Detections and Maximum Observed Concentrations
(in ug/l or ppb) in Selected Water Supplies*

	University of Iowa		Davenport		Clarinda	
	Untreated	Treated	Untreated	Treated	Untreated	Treated
atrazine	$\frac{38}{45}$ (2.76)	$\frac{41}{48}$ (2.95)	$\frac{36}{44}$ (1.20)	$\frac{16}{46}$ (0.56)	$\frac{36}{41}$ (3.86)	$\frac{37}{46}$ (2.15)
alachlor (Lasso)	$\frac{5}{41}$ (1.59)	$\frac{6}{45}$ (1.76)	$\frac{2}{40}$ (0.68)	$\frac{1}{42}$ (0.32)	$\frac{0}{34}$ (<.02)	$\frac{0}{39}$ (<.02)
cyanazine (Bladex)	$\frac{23}{45}$ (1.51)	$\frac{21}{48}$ (1.54)	$\frac{11}{44}$ (0.49)	$\frac{7}{46}$ (0.25)	$\frac{32}{41}$ (2.6)	$\frac{25}{46}$ (1.30)
linuron	$\frac{1}{45}$ (0.20)	$\frac{1}{48}$ (0.23)	$\frac{1}{44}$ (1.03)	$\frac{0}{46}$ (<.20)	$\frac{0}{41}$ (<.20)	$\frac{0}{46}$ (<.20)
metolachlor (Dual)	$\frac{17}{45}$ (1.80)	$\frac{11}{48}$ (0.87)	$\frac{1}{44}$ (0.55)	$\frac{1}{46}$ (0.23)	$\frac{11}{41}$ (0.68)	$\frac{12}{46}$ (0.82)
metribuzin (Sencor)	$\frac{1}{45}$ (0.28)	$\frac{0}{48}$ (<.20)	$\frac{0}{44}$ (<.20)	$\frac{0}{46}$ (<.20)	$\frac{0}{41}$ (<.20)	$\frac{0}{46}$ (<.20)
simazine	$\frac{0}{45}$ (<.20)	$\frac{0}{48}$ (<.20)	$\frac{0}{44}$ (<.20)	$\frac{0}{46}$ (<.20)	$\frac{1}{41}$ (0.27)	$\frac{0}{46}$ (<.20)
trifluralin (Treflan)	$\frac{0}{45}$ (<.20)	$\frac{0}{48}$ (<.20)	$\frac{0}{44}$ (<.20)	$\frac{0}{46}$ (<.20)	$\frac{0}{41}$ (<.20)	$\frac{0}{46}$ (<.20)

*Ratio provided in Table refers to the number of samples having concentrations above the detection limit over the total number of samples analyzed. The number in parenthesis is the maximum observed concentration in ug/l or ppb.

USGS Special Study

A cooperative study between UHL and the United States Geological Survey (USGS), conducted in 1984 and 1985, examined surface water quality in the Cedar River basin (USGS, 1986). In the study, emphasis was placed on investigating the occurrence of and transport of herbicides. Samples were collected from at least six locations within the basin. At each sampling location, both centrifuged and uncentrifuged samples were analyzed for pesticides. This technique provided information to determine the fraction of pesticides attached to settleable material in the sample (e.g., suspended sediments, organics) as compared to the fraction of pesticides found in the soluble phase. Data from this study demonstrated that removal of settleable material generally had little or no effect on the herbicide concentration in a sample. Thus, the majority of today's commonly used herbicides are being transported in the water phase, not attached to sediment particles as had been previously thought to be the principal transport mechanism.

Ground Water Studies

More recently, monitoring for pesticides in Iowa has focused on ground water. A number of research and monitoring studies have shown that water supplies across the state are being contaminated by commonly used pesticides (Hallberg and Hoyer, 1982; Hallberg et al., 1983; Hallberg et al., 1984; Kelley, 1985; Kelley and Wnuk, 1986; Kelley et al., 1986). These studies began in 1981 and have found that public water supplies using relatively shallow ground water, and hence particularly supplies on alluvial aquifer systems, are extremely susceptible to pesticide contamination.

In terms of the individual compounds detected, the concentrations observed and the percent of samples in which pesticides have been detected, there has been a close correlation between the findings from the monitoring of Iowa's ground water and surface water. This is not surprising in that the state's water systems actually represent a highly interrelated hydrologic unit. The base flow for nearly all of Iowa's interior streams is ground water discharge.

F. Statewide Pesticide Usage

Pesticides (herbicides and insecticides) have become an integral part of today's farming operations. Iowa's farmers treat over 97% of the state's corn and soybean acreage each year with pesticides (Wintersteen and Hartzler, 1986). Approximately 75 million pounds of pesticide active ingredient were applied in 1985 alone (Gianessi, 1986). Table 5 identifies the most abundantly used pesticides, by weight of active ingredient, applied to Iowa's agricultural lands.

With the exception of 2,4-D, the remaining five pesticides required to be monitored according to SDWA and state regulations, are not identified as high use pesticides in Table 5. Table 6 contains the present status of use for these six pesticides. Where identified in Table 6, a "restricted use" pesticide is a designation imposed by the Environmental Protection Agency (EPA). A "restricted use" pesticide is restricted to only those specific uses as identified in Table 6, and, must be applied by a certified operator.

TABLE 5

Major Pesticides Applied to Iowa Cropland
Listed in alphabetical order.
(Wintersteen and Hartzler, 1986)

HERBICIDES

<u>Common Name</u>	<u>Typical Trade Name</u>	<u>Common Name</u>	<u>Typical Trade Name</u>
alachlor	Lasso	dicamba	Banvel
atrazine	AAtrex	EPTC+safening add.	Eradicane
bentazon	Basagran	metolachlor	Dual
butylate	Sutan+	metribuzin	Lexone/Sencor
chloramben	Amiben	trifluralin	Treflan
cyanazine	Bladex	2,4-D	used in many multiple mixes

INSECTICIDES

<u>Common Name</u>	<u>Typical Trade Name</u>	<u>Common Name</u>	<u>Typical Trade Name</u>
carbofuran	Furadan	permethrin	Ambush
chlorpyrifos	Lorsban	phorate	Thimet
ethoprop	MoCap	terbufos	Counter
fonofos	Dyfonate		

G. Surface Supply Treatment Methods

Public water supplies in Iowa that use surface streams as a source of water face many difficulties in treatment that supplies using ground water for their source do not have to resolve. Surface water treatment plants must remove objectionable color, tastes and odors and potentially pathogenic microbes. In addition, Iowa's streams can carry heavy loads of sediment and a multitude of chemical pollutants.

Surface water treatment plants are required to meet specific drinking water standards with regard to turbidity, bacteria and certain inorganic and organic chemicals. To meet these standards, and to provide water of acceptable quality to consumers, water treatment plants routinely filter water through sand or some other granular substance. Typically, the treatment these plants use is chemical addition to cause the suspended solids to coagulate and form a settleable material. The combination of chemical addition and filtration have proven to be effective in removing heavy sediment loads and attached pollutants.

TABLE 6

Usage of SDWA Required Monitoring Pesticides

Compound	Status	Usage
Endrin	restricted use	use is restricted to a bird perch poison
Lindane	restricted use for commercial application	use is restricted as a soybean insecticide, lice control for cattle and hogs, and borer insecticide
	general use for home and garden	insecticide
Methoxychlor	general use	basic seed treatment; also used as a residual insecticide
Toxaphene	restricted use	use is restricted to scabies control for cattle and sheep applied through dip vat machines
Silvex	cancelled	product was removed from the market in 1983
2,4-D	general use	high use herbicide

Source: C. Eckerman, Department of Agriculture and Land Stewardship

The filtration systems of the 34 plants monitored in this study ranged from rapid sand filters to granular activated carbon (Table 7). Chemical addition ranged from alum and lime to more sophisticated and numerous compound additions. None of the treatment systems in this study were specifically designed to remove pesticides (synthetic organic contaminants) in solution. These treatment systems do, however, represent the most sophisticated treatment systems in use Iowa.

TABLE 7

Treatment Methods Used by Water Supplies

	<u>Chemical Addition*</u>	<u>Filtration</u>
Afton	A, L, C	sand
Albia	A, L, SA, P, K, CS	sand
Bedford	AS, L	sand
Bloomfield	A, L	N.S
Burlington	C, P, L, A, CO ₂	sand
Central Water System	K, PO, A, PP	sand
Clarinda	AS, C, L	N.S
Clear Lake	L, A, K	sand
Corydon	L, A, PO	sand
Council Bluffs	CS, PO, L, SA, IS, PP	sand (anthracite, sand and gravel)
Creston	A, L	sand
Davenport	PO, C, L, NH ₃ , filter aid, K, AS	granular activated carbon
Des Moines	A, C, K, SAL	sand
Fairfield	A, L, FC, K, C, P	carbon media
Fort Madison	PO, C, L, CO ₂	sand
Greenfield	A, PO, C, SA ²	N.S
Humeston	A, L	sand
Keokuk	A, L, C, CO ₂ , NH ₃ , PP	sand
Lake Park	A, L	sand
Lakeview Heights Homeowners Assoc.	A, L	Anthrifilt
Lamoni	A, L	N.S
Lenox	A, L, C	sand
Montezuma	A, L, C	anthracite and sand
Mount Ayr	L, A, PO, C	sand
Mount Pleasant	L, SA, C, A	sand
Orient	A, L, C, K	sand
Osceola	AS, L	N.S
Ottumwa	IS, A, NH ₃ , P	sand
Panora	AS, L	sand
Rathbun RWA	IS, L, CO ₂ , PP	sand/carbon filter
Spirit Lake	L, A, K, PO	N.S
Sun Valley RWA	A, SA or CA	sand
University of Iowa	A, SA, L, CO ₂ , PP	N.S
Winterset	A, L, K, C	sand

*Codes

A = Alum
AS = Aluminum Sulfate
L = Lime
SA = Soda Ash
P = Phosphate
K = Potassium Permanganate
CS = Copper Sulfate
CO₂ = Carbon Dioxide

C = Carbon
PP = Polyphosphate
PO = Polymer
IS = Iron (III) Sulfate
SAL = Sodium Aluminate
FC = Ferric Chloride
CA = Caustic Soda
NH₃ = Ammonia

Type of
Filtration
N.S = Not Specified
in File

II. Methodology

A. Sampling Methods

Water supply superintendants were contacted by DNR staff in the latter part of April 1986 requesting their participation in this study by collecting samples following any rainfall-runoff event between May and July 1, 1986. With the unpredictability of rainfall, the sample collectors were recommended to sample as early as possible after May 1. Study instructions explaining when to collect the samples were attached to the study notification letters. Sample bottles, a copy of the instructions, and sampling instructions explaining how to collect and label samples and return samples to the UHL were sent out by UHL the first week of May.

Twenty-four surface water supply systems were asked to collect a sample of treated water at their treatment plant that was affected by runoff. These water supplies were asked to determine when their water source was at its poorest quality as affected by runoff (based on best judgement), then allow the water to pass through the treatment system, and collect a sample. In addition, 14 surface water supplies were asked to collect a sample of both their poorest quality source water as affected by runoff and a sample of this water after it had passed through the treatment process. To estimate when the source water had undergone treatment, water supplies were asked to utilize their plant's approximate hydraulic retention time, the estimated time for treatment.

Samples were to be packed in ice or with ice packs and sent to the UHL in Iowa City no later than 24 hours after collection via Purolator. Sample collectors were also asked to complete a sampling information form with each sample submitted. Information requested on this form included: sampling location, sampling date, date of and amount of rainfall received, and estimated hydraulic retention time through the plant.

B. Analytical Methods

Each sample consisted of two one-quart glass jars, specially cleaned and solvent-rinsed with Teflon-lined lids. One jar was used for extraction, concentration, derivatization and analysis of the acid herbicides according to UHL method PR-2 (essentially Standard Methods 509B using two dissimilar capillary columns for quantitation and simultaneous confirmation on a gas chromatograph with electron capture detectors) (American Public Health Association, 1985). The other jar was extracted with 45% methylene chloride in hexane, and after concentration, the extract was analyzed according to UHL method PR-3. This method uses two gas chromatographs, each equipped with two dissimilar capillary columns for quantitation and simultaneous confirmation, for detection of chlorinated hydrocarbon insecticides with electron capture detectors on one instrument and detection of carbonates, organophosphates, and triazine herbicides in one or more runs on the other instrument with NP-specific detectors. The compounds to be determined and the detection limits obtained are listed in Table 2.

III. Results and Discussion

A. General Data Assessment

Of 38 water supplies requested to participate in this study, 35 submitted samples. Because of a laboratory accident, one sample was lost. In total, samples of treated (finished) water from 33 supplies were analyzed for the pesticide compounds listed in Table 2. Fourteen of these supplies also submitted corresponding untreated water samples from their surface water source. One supply provided a sample of untreated water only. The location and type(s) of sample(s) analyzed as part of this study are identified in Table 1. The total population served by the water supplies listed in Table 1 is 635,260, representing approximately 22% of the state's estimated current population.

From all the samples analyzed, ten different pesticide compounds were found at levels above the detection limit. The facilities, type of sample collected, date(s) collected, and detectable pesticide concentrations are contained in Appendix I. All samples were analyzed for the pesticide compounds listed in Table 2 with the following exception. Because of a laboratory accident, four of the 48 samples were not analyzed for the acid herbicides which includes 2,4-D, dicamba, Silvex and chloramben.

Of the 33 samples of treated (finished) water submitted from different surface water supplies, all but three contained a detectable concentration of at least one pesticide compound. Atrazine was present in every one of the water supplies with a detectable level of one or more pesticide compound. Table 8 summarizes the frequency of positive pesticide detections (those pesticides in concentrations at or greater than the detection limit) to the total number of samples analyzed for treated and untreated water samples.

The frequency of the detection of pesticides in treated water supply samples, from increasing to decreasing order, is: atrazine (91%); cyanazine (79%); metolachlor (64%); alachlor (52%); carbofuran (27%); metribuzin (12%); 2,4-D (7%); and, dicamba, trifluralin and butylate (3%). In the untreated water samples, the following frequency of pesticide detection, from increasing to decreasing order, is: atrazine (93%); cyanazine and metolachlor (73%); alachlor (67%); carbofuran (33%); 2,4-D (14%); and, metribuzin and dicamba (7%). Butylate and trifluralin were not detected in any of the untreated samples analyzed. Of the pesticides detected, either in treated or untreated water samples, all can be found in Table 5 which lists the most abundantly applied pesticides, by weight of active ingredients. From the water supplies sampled, 27 of 33 (82%) had multiple pesticide residues (more than one pesticide detected) in the treated water; and, 12 of 15 (80%) had multiple residues in the untreated source water. The number of samples with multiple residues, the number of residues and population served are listed in Table 9.

TABLE 8

Occurrence of Positive Pesticide Detections

	atrazine (Bladex)	cypermethrin (Cyflor)	metolachlor (Dact)	alachlor (Lace)	metribuzin (Sencor)	trifluralin (Treflan)	butylate (Butan)	carbendazim (Furadan)	2,4-D	dicamba (Banwal)
treated water	$\frac{22}{33}$ (91%)	$\frac{22}{33}$ (79%)	$\frac{21}{33}$ (64%)	$\frac{17}{33}$ (52%)	$\frac{4}{33}$ (12%)	$\frac{1}{33}$ (3%)	$\frac{1}{33}$ (3%)	$\frac{2}{33}$ (27%)	$\frac{2}{30}$ (7%)	$\frac{1}{30}$ (3%)
untreated water	$\frac{14}{18}$ (98%)	$\frac{11}{18}$ (73%)	$\frac{11}{18}$ (73%)	$\frac{10}{18}$ (67%)	$\frac{1}{18}$ (7%)	$\frac{0}{18}$ (0%)	$\frac{0}{18}$ (0%)	$\frac{5}{18}$ (33%)	$\frac{2}{14}$ (14%)	$\frac{1}{14}$ (7%)
total	$\frac{44}{48}$ (92%)	$\frac{37}{48}$ (77%)	$\frac{32}{48}$ (67%)	$\frac{27}{48}$ (56%)	$\frac{5}{48}$ (10%)	$\frac{1}{48}$ (2%)	$\frac{1}{48}$ (2%)	$\frac{14}{48}$ (29%)	$\frac{4}{44}$ (9%)	$\frac{2}{44}$ (5%)

KEY: $\frac{\text{# of positive detections}}{\text{# of samples analyzed}}$ (percent)

TABLE 9

Occurrence of Detectable Pesticide Compounds in Treated Water Samples

Number of Individual Pesticides Detected in Treated Water Samples	Number of Supplies With the Number of Pesticides Listed in Column 1	Population Served by These Supplies	Percent of Water Supplies in the Study Containing an Equal or Greater Number of Pesticide Residues Listed in Column 1
1	3	136,725	91%
2	5	2,828	82%
3	5	33,222	73%
4	12	115,485	58%
5	3	239,386	21%
6	3	15,874	9%
7	1	20,000	3%

Thus, from Table 9, 82% of the supplies tested had two or more pesticides detected in the treated water samples, 73% had three or more pesticides detected, 58% had four or more pesticides detected, 21% had five or more pesticides detected, 9% had six or more pesticides detected, and 3% had seven pesticides detected.

The range and mean value of detected pesticide concentrations is provided in Table 10.

TABLE 10

Range of Detected Pesticide Concentrations and Mean Value
µg/l

Pesticide	Treated Water		Untreated Water	
	Range	Mean	Range	Mean
atrazine	0.13 - 24.0	3.8	0.18 - 26.0	4.9
cyanazine	0.13 - 17.0	2.7	0.12 - 20.0	3.8
metolachlor	0.1 - 21.0	2.9	0.1 - 10.0	2.8
alachlor	0.16 - 8.8	1.1	0.13 - 9.3	1.7
metribusin	0.14 - 0.45	0.29	0.89	0.89
trifluralin	0.13	0.13	-	-
butylate	0.27	0.27	-	-
carbofuran	0.18 - 14.0	3.76	0.72 - 17.0	7.1
2,4-D	0.15 - 0.30	0.23	0.15 - 0.17	0.16
dicamba	1.4	1.4	1.2	1.2

B. Treatment Effectiveness

Fourteen of the water supplies participating in this study collected samples of both untreated water and treated water. The treated water sample was to be collected after allowing for adequate treatment time through the plant after collection of the untreated sample. The purpose of collecting the two samples from various water treatment systems was to determine how effective the treatment process was at removing pesticides. The analytical results comparing pesticide concentrations in treated and untreated samples are presented in Table 11. Caution, however, must be utilized in reviewing these results. Bedford, Des Moines and Fort Madison have more than one permanent source of water. Where multiple permanent sources were available, this study failed to obtain necessary information on the blending of these sources. Thus, if blending of different water supply sources occurred, the results in the treated (finished) water sample may be an artifact of dilution with other sources rather than treatment effectiveness. Also, in reviewing sampling information furnished by the water supplies (Appendix II), the collection of samples according to directions is suspect in some cases. Treated and untreated samples from Albia, Bedford and Orient were reportedly collected at the same time; whereas the treated water sample from Clarinda was reportedly collected prior to collecting the untreated samples. For some systems, this may have been the only good way to sample. Because of the short hydraulic retention times of these facilities, it will have to be assumed that pesticide concentrations in the source water did not change significantly.

Data to support this assumption is available from one of the sampling locations. By coincidence on May 19, 1986, one day after the University of Iowa (U of I) treated water sample was collected, a water sample was collected from the water tap at DNR's Geological Survey

Bureau's office, which happens to be served by the U of I system, and analyzed for many of the pesticides included in this study. The results from the sampling on May 19, 1986 are included in Table 11 and show some rather comparable results.

In reviewing the results in Table 11 for the eleven water supplies with only one permanent source, there does not appear to be any significant reduction of pesticide levels in the water source after treatment. Overall, in 51 observed changes in detectable pesticide concentrations between respective untreated and treated samples, concentrations decreased slightly in 38 observations, with a median decrease of .25 µg/l, and, increased in 13 observations, with a median increase of .20 µg/l. The anomaly of an increase in pesticide concentration after with treated water has been previously observed (Richard et al., 1974).

Student's t-tests were performed for atrazine, alachlor, metolachlor, cyanazine and carbofuran to evaluate whether the average change from untreated to treated (finished) water was significantly different from zero; zero being expected if there was no pesticide reduction through treatment. The t-test for all five pesticides showed no statistical difference from zero. This suggests no removal of these materials in the treatment facilities.

For the 13 of these 14 water supplies with detectable concentrations of pesticides in the untreated water, all had detectable concentrations of pesticides in the treated water. Water supply treatment did not appear to substantially reduce or eliminate pesticides from the source water, even with activated carbon filtration as in the case at Davenport. Insufficient data is available from this study to evaluate the removal effectiveness specific treatment methods have on individual pesticide compounds. To develop this database, monitoring of individual treatment techniques over extended periods of time would be necessary.

It was previously thought that pesticides were attached to sediment particles and removal of turbidity in the source water would consequently remove the pesticides. This may have been true for older chlorinated hydrocarbons, but data from this study does not support that argument for many of the currently used pesticides. Recent studies (USGS, 1986) have shown that the majority of modern pesticides are in the soluble fraction, not attached to particulate matter that could be filtered or precipitated out. While most water supply treatment facilities are readily capable of removing turbidity, taste and odor, and bacteria, none of the systems sampled in this survey were designed specifically to remove pesticides. The results of comparing treated with untreated water samples demonstrate that pesticide removal is not occurring with conventional water treatment.

C. Comparison of the Findings with Required Pesticide Monitoring

It is not surprising that of the six pesticide compounds required to be monitored at surface water supplies, only 2,4-D was detected. 2,4-D is, to date, one of the most commonly used agricultural pesticides in Iowa (refer to Table 5). Endrin, lindane, methoxychlor, Silvex and

TABLE 11

Analytical Results Comparing Treated (F-finished) and Untreated (R-raw) Water Samples
(µg/l or ppb)

Water Supply Name		atrazine (Elatec)	cyromazine (Elatec)	metolachlor (Dial)	alachlor (Lasec)	metribuzin (Sensor)	carbofuran (Furadan)	2,4-D	dicamba (Barvel)
Albia	R	1.1	1.4		0.21		1.8		
	F	0.97	1.2		0.24			N.A.	N.A.
Bedford	R	0.47	0.12						
	F	0.59	0.13						
Clerinda	R	0.97	0.31	0.46					
	F	0.72	0.55	0.26					
Council Bluffs	R								
	F								
Des Moines	R	0.24		0.1	0.23				
	F	0.18							
Des Moines	R	0.47	0.44	1.2	0.98		0.72		
	F	0.34	0.29	0.69	0.59		0.38		
Fort Madison	R	21.0	14.0	5.5	5.1	0.89	14.0	N.A.	N.A.
	F	6.0	4.6	1.7	1.7	0.28	4.7		
Huxton	R	26.0	20.0	10.0	0.13		17.0	.17	1.2
	F	24.0	17.0	8.3	0.16		14.0		1.4
Lakewood Hights	R	0.18							
	F	0.2							
Orient	R	1.9		1.0					
	F	0.60		0.3					
Ottawa	R	0.58	0.57	0.72	0.28				
	F	0.72	0.46	0.51	0.29				
Parsons	R	0.54	0.42	0.69	0.43				
	F	0.46	0.35	0.46	0.41				
Rathbun WPA	R	2.2	0.50	0.68	0.14				
	F	1.8	0.62	0.37					
University of Iowa	R	12.0	3.2	9.8	9.3		2.0	.15	
	May 18, 1986	F	15.0	7.2	10.0	8.6	0.31	1.2	.15
	May 19, 1986	F	12.0	5.4	7.8	7.8	<0.1	6.0	N.A.

N.A. = Not Analyzed

R = Raw (Untreated) Water

F = Finished (Treated) Water

*These facilities have more than one permanent untreated
water source and finished water may be a blend.

toxaphene, the other pesticides required to be monitored, have limited use in Iowa. Silvex was removed from the market in 1983 and endrin, toxaphene and lindane (for commercial use) are restricted use pesticides.

While 2,4-D was detected in two of 33 (7%) of the treated water supply samples, atrazine (91%), cyanazine (79%), metolachlor (64%), alachlor (52%), carbofuran (27%) and metribuzin (12%) were detected more frequently and monitoring for these compounds is not required through the federal Safe Drinking Water Act (SDWA) regulations. The SDWA monitoring requirements appear to be inappropriate and inadequate in that no requirements have been imposed on the commonly used pesticides being detected in surface water supplies of the state, but instead include pesticides with EPA "restricted uses" or those of limited usage in the state.

D. Health Impacts

The pesticide concentrations observed in this study are below acute toxicity levels and in many cases below levels assumed to contribute to long-term, chronic problems such as cancer and immunosuppression. However, concerns for chronic health effects are legitimate considering the concentrations observed in this and other studies, the concern with long-term and widespread exposure, and the general lack of knowledge with regard to what constitutes a safe level of exposure over long periods of time.

Although MCLs have been established for 2,4-D and Silvex, work conducted in Sweden has found the formation of human soft tissue sarcomas to be linked to each of these pesticide compounds (Hardell and Sandstrom, 1979). Recent work at the University of Iowa has indicated that the post World War II population of Iowa farmers have a higher incidence of certain cancers than other farm populations or the state as a whole (Burmeister et. al., 1983). This coincides with major changes in agricultural practices, among which was the development of agriculture's heavy use of and reliance upon pesticides. This work is supported by related studies in Nebraska and Illinois which offer similar findings (Blair and Thomas, 1979; Buesching, 1986). A study conducted in Wisconsin has linked exposure to the pesticide aldicarb with changes in the immune system of 23 women. They were exposed by drinking contaminated well water with concentrations of the pesticide below 5 ug/l (Fiore, 1986).

Beyond concerns over chronic health effects which may result from direct ingestion of individual compounds, there are many uncertainties involved with the combination of pesticides and their metabolites that occur in relation to other environmental factors. For example, pesticides in surface water will usually appear in conjunction with other pollutants such as nitrate, and may be accompanied by inorganics (arsenic, heavy metals, etc) and organic solvents (tetrachloroethylene, gasoline components, etc.). The implications to human health of the coexistence of these chemicals in drinking water is unknown.

EPA's preliminary lifetime pesticide health advisory levels, also referred to as the maximum contaminant level goal (MCLG), for the ten pesticides detected in Iowa's surface water supplies can be found in Table 12. Table 12 also includes information on the carcinogenicity of each compound. The lifetime health advisory levels, or MCLGs, reflect calculated concentrations based upon non-carcinogenic, chronic (long-term) toxicity which appear to be without appreciable risk of deleterious effects over a lifetime of exposure. For a known or probable human carcinogen the lifetime health advisory level is zero. Information on carcinogenicity is calculated separately, and is presented in terms of various levels of risk rather than as a presumed safe threshold. The usual level of acceptable cancer risk is 10^{-6} , or

TABLE 12

Preliminary Health Advisory Levels

Pesticide	Lifetime Health Advisory Concentration Based on Chronic Toxicity *(ppb)	EPA Cancer Rating
atrazine	2.5	pending
alachlor (Lasso)	0	probable human carcinogen 10^{-6} cancer risk levels 0.6 ppb - adult 0.16 ppb - child
butylate (Sutan)	490	not classified (insufficient data)
carbofuran (Furadan)	35	not a carcinogen (no cancer appeared in animal studies)
cyanazine (Bladex)	9	not classified (insufficient studies available)
dicamba (Banvel)	1	not classified (insufficient data)
metribuzin (Sencor)	175	not classified (insufficient data)
metolachlor (Dual)	10.5	possible human carcinogen (some animal evidence)
trifluralin (Treflan)	2.1	possible human carcinogen (some animal evidence)
2,4-D	70	not classified (insufficient data)

*Assumes an average weight of a human as 70 kg, the average daily intake of water for that human was two liters and that 20% of the total intake is taken directly as drinking water.

one chance in a million. For alachlor (Lasso), the concentrations associated with a 10^{-6} cancer risk are 0.6 ppb for an adult and 0.16 ppb for a child. In comparing the levels in Table 12 to the analytical results of the treated water samples, 21 of 33 systems exceeded one or more of the preliminary lifetime health advisory concentrations or MCLGs, alone, and 17 of the 33 systems tested exceeded the accepted cancer risk level for children (the most susceptible population) of 10^{-6} with alachlor and seven of the 33 systems exceeded the accepted cancer risk level (0.6 ppb) for adults.

Because we are just beginning to identify pesticides in Iowa's drinking water and chronic disorders may require 20 years or more to manifest themselves, the impact to human health (and resulting economic cost associated with those illnesses) from exposure to low concentrations of one or more pesticides remains to be seen. Clearly, our understanding of the relationship between these chemicals and human health is severely limited. Appendix III provides a brief summary of available toxicity information for pesticides detected in this study.

E. Factors Affecting the Study Results

Additional information provided by water supply personnel collecting the sample(s) including the estimated amount of rainfall received, rainfall date(s) and date of sample collection can be found in Appendix II. In reviewing Appendix II which contains the information describing the circumstances of when the samples were collected, many variables are evident. Among the most obvious variables from Appendix II are: amount of rainfall received prior to sampling; sample collection date; and time between rainfall occurrence and sample collection. Other important variables, not readily obvious from the data in Appendix II, are: the time of pesticide application in relation to sample collection date; watershed size; and amount of runoff experienced.

Pesticides are applied at different times of the crop season. Some are applied as early pre-plant, some as pre-emerge and some as post-emerge. Generally, the first dose of pesticides are applied just prior to planting. It is difficult however to determine whether the pesticides detected in this study were from a recent or previous application.

A summary of statewide planting statistics for May and June 1986 is provided in Table 13. Planting completion and fertilizer application were influenced by weather conditions and thus did have regional differences which are not reflected in the statewide figures. Twenty-seven water supplies submitted samples in the month of May while seven supplies submitted samples that were collected between June 1st and July 11th. Rainfall amounts, after which samples were collected, ranged from 0.12 inch to over seven inches. Samples from some water supplies were collected shortly after the occurrence of rainfall while others were collected up to 11 days after rainfall. The different times of sampling after rainfall were probably related to the following factors: the size of the land area draining into the water body, the amount and intensity of the rainfall, time between rainfall and influence upon water quality, and, the sample collector's judgement of when the surface water was at its poorest quality.

TABLE 13

Statewide Planting Statistics*

<u>Date</u>	<u>% of the Intended Corn Acres Planted</u>	<u>% of the Intended Soybean Acres Planted</u>	<u>Fertilizer Application Completed</u>
April 28, 1986	5	0	64
May 5, 1986	20	0	70
May 12, 1986	65	8	88
May 19, 1986	75	15	90
May 27, 1986	88	35	93
June 2, 1986	92	55	96
June 9, 1986	98	82	
June 16, 1986		95	
June 23, 1986			

*Obtained from Iowa Crops and Weather weekly bulletins, published by Iowa Agricultural Statistics.

In regards to the sample collector's judgement for the timing of the collection of the water samples, several different methods were used. Most often indicated were: increased turbidity levels, increased water levels and increased nitrate levels. Increased nitrate levels may, however, have been related to increases in subsurface and tile drainage and, if used as an indicator for worst case conditions, may not necessarily have been representative of poorest case water quality resulting from surface runoff with regards to pesticide concentrations. Other studies suggest that in surface water as nitrate concentrations increase, pesticides would be decreasing.

Because of the number of variables affecting the results from the different sampled water supply systems, no comparison between the facilities can be made. The factors contributing to the lack of comparability also hold for determining the type of water source most susceptible to pesticide contamination. Thus, it cannot be determined among rivers, reservoirs or lakes which is most likely to be affected by pesticide contamination. The data, however, does clearly indicate that most surface water sources for public water supplies are susceptible to contamination with pesticides.

F. Comparison of Results with Previous Monitoring

The results from this study support the following findings from previous studies.

1. Surface water treatment systems are specifically designed to remove particulate matter including sediments to reduce turbidity levels in source water to acceptable drinking water standards. In 91% of the treated water samples analyzed in this study, one or more pesticides were detected. In those supplies collecting samples of both treated and untreated water, no significant reductions in

pesticide levels was provided for during the treatment process. These findings support other studies that indicate many of the now common pesticides are transported in solution rather than by sediments.

2. The results from this study contained above also support the previous ISU study findings that current treatment processes are ineffective at removing or eliminating pesticides from the water.
3. The pesticide compounds detected in this study are the predominant ones being found in other surface and ground water studies. Of the ten individual pesticides detected in both treated and untreated water samples, all are commonly used in Iowa (Table 5). Since the mid-1970's there has been an increase in the frequency of these compounds being detected in surface waters (Figure 2).

Because surface waters are directly influenced by rainfall events and subsequently runoff, surface waters would be expected to often contain compounds less likely to be detected in shallow ground water. Butylate and carbofuran were detected in this study of surface waters. These compounds have not been detected in ground water. Infiltration to the ground water is a slower process than direct transport to a stream; thus, pesticide concentrations in surface waters are likely to be higher than those characteristically found in ground water. The infiltration process may allow time for pesticide compound decay or breakdown. The pesticide concentrations detected in this study were generally higher than those routinely encountered in ground water.

IV. Conclusions and Recommendations

The following conclusions are based on the findings from this study.

1. Most surface waters used as a source for a public water supply are likely to contain one or more pesticide compounds, at the least, during periods of runoff in spring to early summer.
2. Conventional water supply treatment methods are ineffective at removing pesticides.
3. At least 22% of the state's population, using surface water sources for community public water supplies, are now consuming on a periodic basis one or more pesticide compound in their drinking water.
4. Pesticide monitoring required by the Safe Drinking Water Act regulations appears inadequate for Iowa. Except for 2,4-D, the six SDWA pesticides have limited usage within the State of Iowa. One of them, Silvex, is no longer marketed.
5. All of the ten individual pesticides detected as part of this study are commonly used in Iowa.
6. Except for 2,4-D, there are no monitoring requirements for the pesticides being found in Iowa's community public water supplies.

7. Most pesticides being found in community water supplies have no enforceable established standards or criteria to protect public health.
8. The current level of chemical management and agricultural practices are generally not effective at preventing pesticide contamination of surface waters.
9. Levels of some pesticides found at some treated water supplies currently exceed acceptable cancer risk levels or preliminary lifetime health advisory concentrations under the spring rainfall runoff conditions experienced during this study.

The following recommendations are proposed to better utilize resources for monitoring of public water supplies and to protect human health from pesticide contamination.

1. All commonly used pesticides should be monitored on a regular basis in public water supplies using surface water sources as a condition of their operation permit.
2. The state's public drinking water supply program should place more emphasis on public awareness of unregulated contaminants in the drinking water. A systematic approach for monitoring unregulated contaminants needs to be developed along with a means of informing the public of the occurrence of these unregulated contaminants.
3. The state should encourage and support changes to the Safe Drinking Water Act that more accurately reflect current pesticide usage. The establishment of MCLs and monitoring requirements need periodic review and updating to reflect changes in pesticide use and availability.
4. Since conventional water treatment is ineffective at eliminating pesticides from public water supplies and the implications to human health from exposure to these compounds is unclear, emphasis should be placed on prevention of surface water contamination through more efficient chemical usage and more environmentally sound agricultural practices.

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APPENDIX I

Analytical Results (µg/l or ppb)
 (The entries below are reported values above the level of detection. If no entry is given, the pesticide was below the level of detection.)

Water Supply Name	Date	Type of Sample	Cyanazine (Bladac)	Azinphos methyl (Dumil)	Triphenylethylene (Lasso)	Triphenylethylene (Sancoor)	Triphenylethylene (Treflan)	Triphenylethylene (Furadan)	2,4-D Dinitrophenol (Barvel)
Aften	5-13	F	15.0	4.6	0.44				
Albia	5-19	R	1.4		0.21			1.8	
	5-19	F	1.2		0.24				NA
Bedford	5-12	R	0.12						
	5-12	F	0.13						
Bloomfield	5-07	R	1.3	0.00	0.27				
Burlington	5-05	F	0.20	0.33	0.34				
Central Water System	6-26	F	0.13						
Clarinda	5-27	R	0.31	0.46					
	5-27	F	0.55	0.26					
Clear Lake	5-16	F							
Corydon	6-03	F	0.61	21.0	0.25				
Council Bluffs	5-13	R							
	5-13	F							
Creston	5-20	F	0.45	0.24				0.10	
Deerport	5-12	R	0.24	0.1	0.23				
	5-12	F	0.10						
Des Moines	5-27	R	0.44	1.2	0.90				0.72
	5-27	F	0.29	0.69	0.59				0.30

APPENDIX I
- Continued -

Notes

Sampled Type of atrazine cyanazine metolachlor alachlor metribuzin trifluralin butylate carbofuran 2,4-D dicamba
Water Supply Name in 1966 Sampled (Bladex) (Dial) (Lasso) (Santor) (Treflan) (Sutan) (Furadan) (Bamnel)

Fairfield	6-17	F	1.8	2.1	0.63	0.65														
Fort Madison	5-19	R	21.0	14.0	5.5	5.1	0.89								14.0	NA	NA			
	5-19	F	6.0	4.6	1.7	1.7	0.28								4.7					
Greenfield	5-12	F	0.59	0.51						0.13										
Hamoston	5-19	R	25.0	28.0	10.0	0.13									17.0	0.17	1.2			
	5-20	F	24.0	17.0	8.3	0.16									14.0		1.4			
Keokuk	5-19	F	1.7	0.91	0.61	0.76														
Lake Park	5-14	F	0.32	0.13	0.53	0.23														
Lake View Heights	6-30	R	0.10																	
	7-02	F	0.2																	
Lanesville	5-19	F	9.3	4.1	2.9										6.9	NA	NA			
Larox	5-28	F	0.46	3.1	0.1										0.27	1.70				
Montezuma	5-28	F	2.5	2.1	1.7	0.67	0.14													
Mount Ayr	7-11	F	3.6	1.3	2.2															
Mount Pleasant	5-27	F	5.0	3.9	2.8	2.4														
Orient	6-30	R	1.9		1.0															
	6-30	F	0.60		0.30															
Secola	5-19	F	2.7	1.0	0.19										2.1	NA	NA			
Ottumwa	7-02	R	0.88	0.57	0.72	0.28														
	7-03	F	0.71	0.46	0.51	0.29														

APPENDIX I
- Continued -

Water Supply Name	Date Sampled	Type of Plot	Type of atrazine cyanazine cyromazine metolachlor alachlor metribuzin trifluralin butylate carbosulfuron 2,4-D dicamba												
			(Bladex)	(Dual)	(Lasso)	(Sencor)	(Proflam)	(Atrun)	(Furadan)	(Barvol)					
Parsons	5-12	R	0.56	0.42	0.69	0.43									
	5-12	F	0.46	0.35	0.46	0.41									
Methuen MA	5-22	R	2.2	0.50	0.60	0.14									
	5-22	F	1.8	0.62	0.37										
Spirit Lake	5-07	F													
San Valley	5-13	F	1.2	0.23											
University of Iowa	5-18	R	12.0	3.2	9.0	9.3							2.6	0.15	
	5-18	F	15.0	7.2	10.0	0.8	0.31						1.2	0.15	
Winterest	5-15	F	3.2	2.5	0.61	1.0								0.30	

Abbreviations

MA = acid herbicides were not analyzed
R = rest (untreated) water
F = finished (treated) water

APPENDIX II

Sample Collection Information Provided by Sample Collectors

Name of County	Date of Rainfall 1986	Estimated Amount of Rainfall (inches)	Hydraulic Retention Time (hours)	Date and Time of Untreated Water Sample Collection*	Date and Time of Treated Water Sample Collection*
Afton	5-14	1.0	5.5		5-13 at 3:00 pm
Albia	not given	not given	not given	5-19 at 12:30 pm	5-19 at 12:30 pm
Bedford	5-09 to 5-11	2.75	6	5-12 at 10:45 am	5-12 at 10:45 am
Bloomfield	5-07	1.25	4	5-07 at 2:00 pm	
Burlington	4-29	> 2	24 to 30		5-05 at 1:00 pm
Central Water System	6-20 to 6-21	1.85	1.8		6-26 at 9:40 am
Clarinda	5-17	.5	1	5-27 at 7:30 am	5-27 at 6:35 am
Clear Lake	5-09 to 5-13	4.75	2		5-14 at 1:15 pm
Corydon	5-19 to 6-03	5	3		6-03 at 11:00 am
Council Bluffs	5-12	1	12	5-14 at 12:30 am	5-13 at 12:30 pm
Creston	5-15 to 5-17	3	4		5-20 at 9:09 am
Davenport	5-05 to 5-11	.12	3.5 to 4	5-12 at 12:40 pm	5-12 at 3:40 pm
Des Moines	not given	not given	not given	5-27 at 6:30 am	5-27 at 8:00 am
Fairfield	6-14	.5	6		6-17 at 2:00 pm
Fort Madison	5-16 to 5-17	3	3	5-19 at 10:00 am	5-19 at 1:00 pm
Greenfield	5-10 to 5-11	2.5	.33		5-12 at 11:30 am
Houston	5-15 to 5-17	7 to 8	16	5-19 at 4:40 pm	5-20 at 8:20 am
Keokuk	5-16 to 5-17	3.5	8		5-19 at 1:00 am
Lake Park	5-12	2.06	1.5		5-14 at 10:00 am
Lakeview Heights	6-28 to 6-30	> 3	11 to 12	6-30 at 2:45 pm	7-02 at 12:00 pm
Lamoni	5-16	3.02	3		5-19 at 1:40 pm
Lenox	5-16 to 5-17	2	8		5-28 at 1:00 pm
Montezuma	5-13 to 5-19	3.99	6		5-20 at 2:00 pm
Mount Ayr	7-08 to 7-09	4	2.25		7-11 at 11:30 am
Mount Pleasant	5-16 to 5-17	4.4	14.5		5-27 at 9:00 am
Orient	6-29	1	1	6-30 at 2:00 pm	6-30 at 2:00 pm
Osceola	5-12 to 5-17	5	2		5-19 at 8:00 am
Ottumwa	6-30 to 7-01	1 to 1.5	16	7-02 at 4:30 pm	7-03 at 8:30 am
Panora	5-10 to 5-11	4	2.5	5-12 at 6:00 am	5-12 at 9:00 am
Rathbun RYA	5-15 to 5-17	5.25	4	5-22 at 4:00 am	5-22 at 8:00 am
Spirit Lake	4-27	.25	3		5-07 at 12:00 pm
Sun Valley	5-08 to 5-13	1.5 to 1.75	6 to 10		5-13 at 6:00 pm
University of Iowa	5-11 to 5-17	> 7	7.4	5-18 at 2:30 pm	5-18 at 10:00 pm
Winterset	5-14 to 5-15	2	6.7		5-15 at 3:30 pm

* 1986

APPENDIX III

Toxicity Information

The following is a data summary of toxicity studies for some commonly used pesticides. The values from these studies are used to determine acceptable daily intake and preliminary health advisory levels. In establishing these levels, standard safety factors are used. Typically used minimal safety factors are listed below.

Standard Safety Factors for Toxicological Effects

<u>Effect</u>	<u>Safety Factor*</u>
cholinesterase inhibition based on two-year rodent or dog studies	100
cholinesterase inhibition based on human NOEL (no observed effects level)	10
general toxicity based on chronic studies	100
cholinesterase inhibition based on subchronic studies	200
teratogenic effects	at least 100
general toxicity based on subchronic studies	2,000

*These are minimal safety factors and actual margins of safety may be higher.

COMPOUND

DATA SUMMARY

- Atrazine - Rat teratology, NOEL = 100 mg/kg 1-year dog feeding,
- Negative mutagenicity (1 study) CORE supplementary:*
- The other pivotal data are not adequate (CORE supplementary) to regulate this chemical
- 2-year dog feeding, NOEL = 150 ppm (LDT)
- 2-generation rat reproduction, NOEL = 100 ppm (HDT) using the 80W formulation

*The CORE classification system was developed by the Office of Pesticide Programs in 1977 to assess the adequacy of toxicology studies.

LDT = Low Dose Test

HDT = High Dose Test

IBT = Industrial Bio-Test Laboratories

COMPOUNDDATA SUMMARY

- Metolachlor - 6-month dog feeding, NOEL = 100 ppm 6-month dog feeding,
(Dual) - 2-year supplementary (IBT) onco. in rat: weak oncogen, i.e., liver tumors
- 2-year chronic in rat (repeat study): weak oncogen - liver tumors, NOEL = 30 ppm (testicular atrophy)
- 2-year oncogen in mouse negative at 3,000 ppm (Highest Dose Tested (HDT) Industrial Bio-Test, validated)
- 3-generation rat reproduction - 300 ppm
- Teratology rat NOEL = 360 mg/kg (HDT)
- Teratology rabbit NOEL = 360 mg/kg
- Mutagenicity: negative (2 tests)
- Positive skin sensitizer
- 2-year oncogen in mouse: negative at 3,000 ppm (HDT).
- Cyenzine - Teratology in Fisher rat: a potential weak teratogen (NOEL for
(Bladex) study not yet determined: 10 mg/kg for micro-ophthalmia/anophthalmia, and pending additional studies, the NOEL may be lower than 1 mg/kg (LDT) for liver-induced hernia)
- Teratology in SD rat: negative at 30 mg/kg (HDT) (however, MTD not tested)
- Teratology in rabbit: negative at 4 mg/kg (HDT), NOEL = 1 mg/kg/day
- 2-year oncogen in mice: negative at 1,000 ppm (HDT)
- Metribuzin - Rabbit teratology; NOEL = 15 mg/kg (HDT)
(Sencor) - Mutagenicity: negative (3 tests). All the other pivotal data were not CORE classified
- 2-year dog feeding; NOEL = 100 ppm
- 2-year rat feeding/oncogen, negative for oncogenicity; NOEL = 300 ppm
- 2-year mouse oncogen, negative at 3,200 ppm (HDT)
- Rat teratology, NOEL = 100 mg/kg (HDT)
- 3-generation reproduction, NOEL = 300 ppm
- Trifluralin - Rabbit teratology; NOEL = 450 mg/kg (supplementary data) not CORE classified
- 4-generation rat reproduction; NOEL = 200 ppm (LDT) (supplementary data). All other pivotal data were not CORE classified.
- Mouse onco: positive, hepatocellular adenoma and carcinoma, alveolar-bronchiolar adenoma, and squamouscell carcinoma in female mice
- Rat onco: negative at 6,500 ppm (HDT)
- Reproduction: dog, NOEL = 25 mg/kg
- 2-year feeding rat, NOEL = 2,000 ppm
- 3-year dog, NOEL = 10 mg/kg (liver weight changes)
- 2-year dog, NOEL = 10 mg/kg (HDT)

ENVIRONMENTAL PROTECTION COMMISSION

ITEM 12

DECISION

NOTICE OF INTENDED ACTION -- CHAPTER 102, "PERMITS"

Iowa Code section 455B.304 requires the Commission to adopt rules that prohibit land burial or disposal by land application of wet sewer sludge at a sanitary landfill.

The term "wet sewer sludge" contained in Iowa Code section 455B.304 is taken to mean municipal sewage sludge which contains more liquid than solid, that is, equal to or greater than 50 percent liquid. The proposed rule change adds language to rule 102.14(3)a which restricts burial or disposal by land application of municipal sewage sludge at a sanitary landfill to sludge which has a solids content greater than 50 percent.

Stu Schmitz
October 27, 1987

(122.MIN/sc)

ENVIRONMENTAL PROTECTION COMMISSION [567]
Notice of Intended Action

Pursuant to the authority of Iowa Code section 455B.304, the Environmental Protection Commission proposes to adopt an amendment to 567--Chapter 102, "Permits," Iowa Administrative Code.

Iowa Code section 455B.304 requires the Commission to adopt rules that prohibit land burial or disposal by land application of wet sewer sludge at a sanitary landfill.

The term "wet sewer sludge" contained in Iowa Code section 455B.304 is taken to mean municipal sewage sludge which contains more liquid than solid, that is, equal to or greater than 50 percent liquid. The proposed rule change adds language to rule 102.14(3)a which restricts burial or disposal by land application of municipal sewage sludge at a sanitary landfill to sludge which has a solids content greater than 50 percent.

Any interested person may file with the Director written comments on the proposed amendments through January 8, 1988. Interested persons may also provide oral comments at public hearings to be held in Iowa City, Council Bluffs and Des Moines as follows: Wednesday, January 6, 1988 at 1:00 p.m. in the conference room of the Geological Survey Bureau, 125 North Capitol Street, Iowa City, Iowa, on Thursday, January 7, 1988 at 1:00 p.m. in the Community Hall Room, 205 South Main, Council Bluffs, Iowa; and on Friday, January 8, 1988 at 1:00 p.m. in the east half of the fifth floor conference room of the Wallace State Office Building, 900 East Grand Avenue, Des Moines, Iowa.

This rule is intended to implement Iowa Code section 455B.304.

The following amendment is proposed:

Amend rule 102.14(3)a(455B) as follows:

a. Unstabilized sewage sludge, including unstabilized septic tank pumpings, shall not be disposed in the portion of a sanitary landfill open to the public. Municipal sewage sludge, whether stabilized or unstabilized, may be disposed of at a sanitary landfill as provided in Chapter 103 or 121 only if the sludge has a solids content greater than 50 percent.

Date

Larry J. Wilson, Director

(EP102A.RUL/sc)

ENVIRONMENTAL PROTECTION COMMISSION

ITEM 13

INFORMATION

CHAPTER 38 -- PRIVATE WATER WELL CONSTRUCTION PERMITS AUTHORIZED UNDER 455B.187

The Commission is requested to approve the Notice of Intended Action for Chapter 38 of the IAC.

Chapter 38 of IAC is proposed to implement the issuing of new private water well drilling and construction permits as authorized under Chapter 455B.187, Code of Iowa, as amended by Section 304 (HF631, 1987 Acts).

Upon authorization by the Commission, three public hearings on the proposed rules will be held throughout the state beginning on _____, 1988, and written and oral comments will be received through _____, 1988. The results of the comments and recommendations are scheduled to be brought back to the Commission at the _____, 1988 meeting.

Implementation of these rules will allow the department to issue approximately 2,000 private water well drilling and construction permits per year, and to register about 4,000 existing wells per year.

Victor I. Okereke

October 22, 1987

(I18.MIN/sc)

ENVIRONMENTAL PROTECTION COMMISSION [567]
Notice of Intended Action

Pursuant to the authority of Iowa Code section 455B.187 as amended by 1987 Iowa Acts, House File 631, section 304, the Environmental Protection Commission intends to create a new Chapter 38, "Private Water Well Construction Permits."

Iowa Code section 455B.187, as amended by 1987 Iowa Acts, House File 631, section 304, requires all landowners or landowners' agents to obtain private well construction permits from the Department of Natural Resources prior to the construction of any new wells on their property. In addition, the Department is precluded from issuing a permit to an applicant until all existing wells on the property have been registered with the Department. Also, the authority to issue private well construction permits may be delegated to county boards of supervisors, but the Department retains concurrent authority. Further, all counties may issue emergency drilling permits in those cases where emergency drilling is necessary to fulfill an immediate need for water. The Department intends to create a new Chapter 38(455B), to implement these statutory provisions. Generally, this chapter provides procedures and conditions governing applications for and issuance of private water well construction permits.

More specifically, the proposed rules: (i) define the type of wells requiring construction permits; (ii) require a twenty-five dollar (\$25) filing fee per application; (iii) require all permitted wells to be constructed by a registered driller in accordance with Chapters 37 (Registration of Water Well Contractors) and 49 (Nonpublic Water Wells) of these rules; (iv) authorize each county board of supervisors or the board's designee to grant emergency well construction permits to satisfy an immediate need for water; and (v) provide for a well construction permit to expire after one calendar year from the date of issuance if well construction is not started prior to that date. Further, the proposed rules specify the conditions under which a drilling permit could be denied and outline the appeal procedures. Finally, the procedures for delegating the Department's permit-issuing authority to the counties are specified in addition to the conditions under which such a delegation may be revoked by the Department.

In accordance with Iowa Code section 17A.31, notice is hereby given that these rules may have an impact on small business.

Any interested person may file written comments or suggestions on the proposed rules through _____, 1988. Such written materials should be directed to Victor Okereke, Iowa Department of Natural Resources, Wallace State Office Building, 900 East Grand, Des Moines, Iowa 50319-0034. Persons are also invited to present oral or written comments at public hearings which will be held on _____, 1988 at _____ at the Iowa Department of Natural Resources, Geological Survey Bureau, Trowbridge Hall, 123 North Capitol, Iowa City, Iowa 52242; on _____, 1988 at _____ in the fifth floor conference room, Wallace State Office Building, 900 East Grand, Des Moines, Iowa 50319-0034; and on _____, 1988 at _____ at the Iowa Western Community College, Continuing Education Building, Room _____, Council Bluffs, Iowa 51501.

Copies of the proposed rules may be obtained from the Records Section, Iowa Department of Natural Resources, Wallace State Office Building, 900 East Grand, Des Moines, Iowa 50319-0034.

These rules are intended to implement 1987 Iowa Acts, House File 631, section 304 and Iowa Code subsection 455B.105(12).

Chapter 38
PRIVATE WATER WELL CONSTRUCTION PERMITS

567--38.1(455B) Definitions.

"Abandoned well" means a water well which is no longer in use or which is in such a state of disrepair that continued use for the purpose of accessing groundwater is unsafe or impracticable.

"Agreement" means a signed document between the department and the county board of supervisors with which the department delegates the authority to issue private well drilling permits to the county board of supervisors or its designee.

"Contiguous" means any number of parcels of land that physically touch one another except that tracts of land separated by roads, railroads, or streams shall be deemed contiguous.

"Contractor" means a person engaged in the business of well construction or reconstruction. The term may include a corporation, partnership, sole proprietorship, association or any other business entity, as well as any employee or officer of such an entity.

"Construction" means the physical act or process of making a water well including, but not limited to, siting, excavation, construction and installation of equipment and materials necessary to maintain and operate the well.

"Department" means the Iowa Department of Natural Resources.

"Director" means the director of the department or a designee.

"Groundwater" means any water below the surface of the earth.

"Inactive water well" means a water well which is not currently in use and is capped or sealed to prevent the entrance of contaminants into the well, but is in such a condition that it can be activated to produce a safe supply of water.

"Landowner" means an individual, trust, partnership, corporation, government or governmental subdivision or agency, association or other legal entity that has legal or equitable title to a piece of land.

"Landowner's agent" means a person who acts for or in place of the landowner by authority from the landowner.

"Private water well" means a well that does not supply a public water supply system.

"Protected source" means a surface water or groundwater source recognized by rule as deserving special protection in order to ensure its long-term availability, in terms of either quality or quantity, or both, to preserve the public health and welfare.

"Public water supply system" means a system for the provision to the public of piped water for human consumption, if such system has at least fifteen (15) service connections or regularly serves an average of at least twenty-five (25) individuals daily at least sixty (60) days out of the year. Such term includes (1) any collection, treatment, storage, and distribution facilities under control of the supplier of water and used primarily in connection with such system, and (2) any collection (including wells) or pretreatment storage facilities not under such control which are used primarily in connection with such system.

"Water well" means an excavation that is drilled, cored, bored, augered, washed, driven, dug, jetted, or otherwise constructed for accessing groundwater. Water well does not include an open ditch or drain tiles.

567--38.2(455B) Forms. The following application form is currently in use:
Application for a permit to construct a new private water well. 11/87.
542-0988.

567--38.3(455B) Permit requirement.

38.3(1) When permit required. A landowner or landowner's agent shall not drill or construct a new private water well without first obtaining a well construction permit issued by the department or by a county board of supervisors or the board's designee authorized to issue such permits pursuant to rule 38.15(455B). Examples of private water wells requiring well construction permits include, but are not limited to: domestic wells, livestock wells, irrigation wells, recreational wells, monitoring wells, heat pump wells, industrial wells, and dewatering wells.

38.3(2) Exemptions. Examples of excavations that are not private water wells and so do not need private water well construction permits and need not be reported include, but are not limited to: soil borings, percolation test holes, sand and gravel and limestone exploration holes, excavations for storing and extracting natural gas or other products, gravel pits and quarries. Test holes, used to determine the availability, quality or depth of groundwater are also exempt provided that all the following conditions are met.

- a. The use of the test hole is limited to the conduct of the test only.
- b. The duration of the test is not more than seven consecutive days.
- c. The test hole is properly closed immediately after the test is completed.

38.3(3) Caveat. Nothing in these rules shall be construed as exempting public water supply wells from the construction permit and water withdrawal permit provisions of part 567, Iowa Administrative Code.

567--38.4(455B) Form of application. Application shall be made on forms supplied by the department. Each application shall list all wells, including abandoned wells, on the applicant's property contiguous to the well site described in the application and shall describe the location of each well site. The location shall be given in the form of a legal land description (section, township and range) to the nearest quarter of a quarter of a section and noted on a map or aerial photograph. The list of wells to be registered shall include but is not limited to abandoned wells, inactive wells, agricultural drainage wells, irrigation wells, domestic wells and livestock wells.

567--38.5(455) Fees.

38.5(1) Fee payment. Each application shall be accompanied by a nonrefundable fee of twenty-five dollars (\$25) in the form of a check or money order payable to the Department of Natural Resources, unless a county board of supervisors or the board's designee is authorized to issue private well construction permits pursuant to rule 38.15(455B). In such cases where the permitting authority is delegated to the county, the county board of supervisors may set a different fee and shall designate the terms for fee payment. More than one proposed well on one contiguous piece of property may be listed on one application and only one fee need be paid irrespective of the number of wells listed on the application form. A proper application shall consist of a fully and properly completed form and nonrefundable fee.

38.5(2) Exemption. The department is exempt from the fee payment requirements of these rules.

567--38.6(455B) Well maintenance and reconstruction. A private well construction permit is not required for the repair, maintenance, rehabilitation or reconstruction of an existing well. Changes in physical dimensions included in these exemptions include, but are not limited to: deepening the well and changing the diameter or length of the casing or the screen. Replacement wells do require a private well construction permit.

567--38.7(455B) Emergency drilling. Each county board of supervisors or the board's designee may grant an emergency permit to a landowner or the landowner's agent if emergency drilling is necessary to meet an immediate need for water. A copy of the permit application and fee shall be sent to the department within thirty days of the granting of the permit by the county board of supervisors or its designee. The emergency permit and application must be signed by the board of supervisors or the board's designee and shall be on forms obtained from the department. In the event the permitting authority has been delegated to the county, no fee need be remitted to the department.

567--38.8(455B) Permit issuance and conditions.

38.8(1) When issued. Upon receipt of a complete application, the department shall issue a permit to the landowner or landowner's agent except as provided in rules 38.7(455B), 38.12(455B) and 38.15(455B).

38.8(2) Not withdrawal permit. Each permit shall include notification that a private well construction permit is not a water withdrawal permit and does not eliminate the necessity of obtaining any water withdrawal permits required in Chapters 51 and 52 of these rules. A water withdrawal permit is required before an applicant can withdraw more than 25,000 gallons of water per day, from any source or combination of sources in the state of Iowa.

38.8(3) Construction by registered well driller. Each well construction permit shall require that each well shall be constructed by a registered well driller in compliance with Chapters 37 and 49 of these rules.

567--38.9(455B) Noncompliance. Violations of any of the provisions of this chapter may be addressed by the department pursuant to Iowa Code sections 455B.109, 455B.175 and 455B.191.

567--38.10(455B) Expiration of a permit. A private well construction permit shall expire one calendar year from the date of issuance. If construction of the proposed well is not started prior to the expiration date, a new application plus a new nonrefundable fee must be filed with the department or the county board of supervisors pursuant to rule 38.15(455B).

567--38.11(455B) Transferability. A private well construction permit is not transferable.

567--38.12(455B) Denial of a permit. The department may deny a private well construction permit if granting the permit would lead to the violation of state law, would result in groundwater contamination, would lead to withdrawal from a protected source; or the director determines that the well would threaten public health or the environment.

567--38.13(455B) Appeal of a permit denial. Any applicant aggrieved by a decision issued under the provisions of this chapter may file a notice of appeal with the director. The notice of appeal must be filed within thirty

(30) days of the date of the permit decision. The form of the notice of appeal and appeal procedures are governed by Chapter 7 of these rules.

567--38.14(455B) Effective date. The provisions of this chapter of the rules shall become effective on _____, _____.

567--38.15(455B) Delegation of authority to county board of supervisors.

38.15(1) Application by board. A county board of supervisors requesting the authority to issue private well construction permits shall apply to the department in accordance with Chapter 28E, Code of Iowa. The application shall include statements of agreement to comply with this chapter of the Iowa Administrative Code. Additional information may be requested by the department.

38.15(2) County standards. The county board of supervisors may impose additional standards as local conditions dictate, but cannot be less stringent than those required by the provisions of this chapter.

38.15(3) Information to department. The delegation agreement shall provide for the method, format and frequency of reporting all permit application information to the department.

38.15(4) Board authority. After delegation of authority to a county board of supervisors, all applications in that county shall be made to the board or its designee.

38.15(5) Term of delegation. The delegation of authority shall be for up to five years and may be redelegated at the discretion of the department.

567--38.16(455B) Concurrent authority of the department. Notwithstanding the delegation of permit granting authority pursuant to rule 38.15(455B), the department reserves the right to exercise concurrent authority. In cases where the board or its designee fails to act on an application, or the director determines that a particular application cannot be appropriately evaluated by the board or its designee, the department may review such an application without invoking the provisions of rule 38.17(455B).

567--38.17(455B) Revocation of delegation agreement. The department may revoke the delegation to issue private well construction permits if the board of supervisors or its designee: failed or refused to carry out the provisions of this chapter in a timely manner; or violated any of the provisions of the delegation of authority agreement with the department.

Date

Larry J. Wilson, Director

(EP38.MIN/sc)

ENVIRONMENTAL PROTECTION COMMISSION

ITEM 14

DECISION

A rule is attached for siting low level radioactive waste disposal facilities. The proposed rule was submitted for public comment and hearings were held in Iowa City, Des Moines and Council Bluffs. No public comments were received. One change was made to the original proposal to clarify that the siting criteria document was dated August, 1987. The Chapter 152, "Criteria for Siting Low-Level Radioactive Waste Disposal Facilities" is ready for adoption by the commission.

Allan Stokes
October 30, 1987

ENVIRONMENTAL PROTECTION COMMISSION [567]
Adopted Rule

Pursuant to the authority of the Iowa Code section 455B.485, the Environmental Protection Commission hereby adopts a new 567--Chapter 152, "Criteria for Siting Low-Level Radioactive Waste Disposal Facilities," Iowa Administrative Code.

The Notice of Intended Action for this amendment was published in the Iowa Administrative Bulletin on September 9, 1987 as ARC 7917. Hearings were held in Iowa City, Des Moines and Council Bluffs to receive comments on the proposal. No comments were received.

One correction to the original proposal has been made. The criteria document referenced in section 152.3(3) is the document dated August, 1987. The date "August, 1987" will be added to the rule.

This rule amendment is intended to implement Iowa Code section 455B.485, and will become effective January 20, 1988.

The following amendment is adopted:

Chapter 152
CRITERIA FOR SITING LOW-LEVEL RADIOACTIVE
WASTE DISPOSAL FACILITIES

567--152.1(455B) Authority, purpose and scope.

152.1(1) Authority. This chapter is authorized in the 1986 Iowa Code section 455B.485 paragraph 2, which relates to the siting of low-level radioactive waste disposal facilities.

152.1(2) Purpose. These regulations establish criteria for identifying sites which are suitable for operation of low-level radioactive waste disposal facilities. The waste management authority will apply these criteria to identify and recommend to the commission sites suitable for locating these facilities.

152.1(3) Scope. These regulations apply only to facilities which are owned or operated by the state of Iowa and privately owned or operated facilities which are located upon land owned by the state of Iowa which are used for low-level radioactive waste disposal pursuant to Iowa Code section 455B.485 paragraph 2.

567--152.2(455B) Definitions. In addition to the definitions in Iowa Code section 455B.481, the following definitions apply to this chapter:

"Aquifers" means water-bearing geological formations, group of formations, or part of a formation that is capable of yielding significant amounts of groundwater for beneficial use.

"Conservation area" means any park, recreation area, wildlife area, forest, prairie, preserve, natural area, scenic area owned, managed, or under control of any government agency or organized conservation group on or before the date of enactment of these rules.

"Criterion" means a test, rule, measure, or model by which judgment will be made.

"Critical wildlife habitat" means any areas known to be inhabited on a seasonal or permanent basis by, or to be critical at any stage of the life cycle of any wildlife or vegetation identified as "rare," "threatened," or "endangered" by official federal or state lists of species, or is under active consideration for listing.

"Cultural area" means any known property of recognized archaeological, architectural, cultural or historical significance as listed in or eligible

for the National Register of Historic Places, the significant State Site records of the Office of Historic Preservation, the Office of the State Archaeologist, or is under active consideration for listing. Archaeological property shall include, but is not limited to, ancient mortuary sites.

"Dam hazard area" means any area identified as areas of dynamic flooding below a dam (the inundation zone) or areas of static flooding above a dam (flood pool). The inundation zone includes the area that would be flooded by a flood wave generated by dam failure during a one hundred (100)-year flood. The static flooding zone is equal to the pool level reached during a one hundred (100)-year inflow flood, or the top of the dam, whichever is greater.

"Drinking water source" means the groundwater or surface water intake of drinking water used for human consumption.

"Facility" means any hazardous waste management facility including land and structures, appurtenances, improvement and equipment for handling, treatment, storage or disposal of hazardous wastes.

"Floodplain" means the land adjacent to a stream which has been or may be inundated by a flood having the magnitude of the regional one hundred (100)-year flood.

"Geological hazard structures" means any faults, fracture zones, or other structures that may provide pathways to groundwater.

"Karst areas" means a type of topography or surface area covered by alluvial or colluvial sediments that may form over limestone, dolomite, or gypsum formations by dissolving or solutions, and that are characterized by closed depressions or sinkholes, caves, and underground drainage.

"Mineral and energy resources" means minerals, construction materials, metals, coal, gas, and oil.

"Mining activity" means any area of past or present underground or surface mining, mineral extraction, or major exploration or production drilling for oil, gas, or mineral resources, and any area likely to be influenced by mining activity through subsidence or surface deformation.

"Nonattainment area" means any area not attaining the National Ambient Air Quality Standards as defined in Part D of the Clean Air Act.

"Population area" means any commercial, school, church, social, medical facility, elderly housing, correctional facility, mobile home park, or incorporated residential area.

"Prevention of significant deterioration" is defined in Part C of the Clean Air Act.

"Prime farmland" means any area identified as such by the United States Department of Agriculture, Soil Conservation Service.

"Protected basins" means any portion of the drainage basin of protected water areas within two (2) miles of the water area. Protected water areas are those classified as such pursuant to Iowa Code chapter 108A, or high-quality waters, high-quality resource waters or Class "C" waters designated in Chapter 61 of the department's rules.

"Proximity to major generators" means within fifty (50) miles of the central point of generation based on the latest available RCRA biennial report on hazardous waste generation in Iowa.

"Seismic risk" means the relative geologic stability of the site based on the likelihood of structural damage due to seismic events. Seismic risk categories, as developed by the National Oceanographic and Atmospheric Administration, will be used to rate relative stability.

"Site" means the land area upon which a facility is, or is proposed to be, physically located, including but not limited to adjacent land use for utility

systems such as repair, storage, processing, or other areas incident to the facility or operation.

"Siting authority" means the party with the specific authority to select sites for facilities.

"Transportation routes" means any public all-weather hard-surfaced road with adequate capacity to carry the type and volume of commercial vehicular traffic serving the facility for the entire year with no embargoes, special permits or other restrictions on roads, overpasses or bridges that would prevent transportation to the facility.

"Utilities and services" means electricity, gas, water and sewer utilities, and police, fire protection, and emergency medical services.

"Wetlands" means any area inundated by surface or groundwater with a frequency sufficient to support, under normal circumstances, a prevalence of vegetation or wildlife requiring saturated or seasonally saturated soil conditions for growth or reproduction. These areas include swamps, marshes, bogs, sloughs, wet meadows, mudflats, sandflats, ponds, lakes, and similar areas.

567--152.3(455B) Siting criteria. The siting authority shall use the following criteria in selecting sites for facilities.

- 151.3(1) Exclusionary criteria. No facility shall be sited within:
 - a. An area of seismic risk category of four (4) or greater;
 - b. A one hundred (100)-year floodplain;
 - c. A dam hazard area;
 - d. An area with less than one hundred (100) feet of aquitard between the base of operation and the subjacent aquifer;
 - e. One (1) mile of a geologic hazard structure;
 - f. One (1) mile of a karst area;
 - g. One (1) mile of an area of past or present surface or underground mining activity;
 - h. One (1) mile of wetland;
 - i. Any protected basin; or
 - j. Ten (10) miles of any nuclear power plant.

152.3(2) Quantitative criteria. The quantitative criteria and corresponding values which are to be applied are in Table 1 as follows:

Table 1

	Value Assigned		
	<u>5 points</u>	<u>2 points</u>	<u>Excluded</u>
Mineral and Energy Resources	No significance present within one mile	Significant presence with perpetual ban on recovery	---
Drinking Water Sources	No sources within one mile	Source permanently closed and alternative water source provided	---
Critical Wildlife Habitats	No habitat within one mile	Permanent buffer and no interference	Interference
Conservation Areas	No area within one mile	Permanent buffer and no interference	Interference

Cultural Areas	No area within one mile	Permanent buffer and no interference	Interference
Population Areas	No area within one mile	Permanent buffer and no interference	Interference
Prime Farmland	Less than 25% prime farmland	More than 25% prime farmland	---
Nonattainment With NAAQS	No significant impact predicted	Little significant impact predicted	---
Prevention of Significant Deterioration	Good data available and sufficient increments	Little data available but increment available	---
Transportation Routes	Within 5 miles of major highway, 10 miles of a rail line, and 50 miles interstate highway	Beyond 5 miles from major highway, 10 miles of a rail line, or 50 miles from interstate highway	---
Proximity to Major Generators	Within 50 miles major generators	Beyond 50 miles from generators	---
Utilities and Services	Accessible services available	Sites needing services extended	---

152.3(3) Methodology. The methodology to be used by the siting authority in applying these criteria is contained in the report "Hazardous Waste Management Facility Siting Criteria and Methodology, August, 1987" which is adopted by reference. The criteria listed in this rule shall be applied in three steps as follows:

- a. Step 1. The exclusionary criteria shall be applied to the entire state. Step 2 shall be applied to those areas remaining.
- b. Step 2. The quantitative criteria shall be applied to the nonexcluded areas identified in step 1. The values in table 1 shall be applied and the potential sites ranked in order of priority.
- c. Step 3. The top rated potential sites shall be subject to detailed evaluation. The best site for the facility shall be selected.

Date

Larry J. Wilson, Director

(EP152.RUL/sc)

ENVIRONMENTAL PROTECTION COMMISSION

ITEM

15A

DECISION

MEMORANDUM OF AGREEMENT--UNIVERSITY OF NORTHERN IOWA

The Commission is requested to approve the memorandum of agreement between the Department of Natural Resources and the University of Northern Iowa to develop a comprehensive plan for the establishment of a small business assistance center for the management of solid and hazardous substances.

Senate File 396 directed the Waste Management Authority Division of the Department of Natural Resources to develop a comprehensive plan for the establishment of a small business assistance center. House File 631 specifically identified the University of Northern Iowa as the site for the center and appropriated \$50,000 from the Groundwater Fund for the University for implementation. It was determined that a cooperative effort between the Department and the University was the most efficient approach to the preparation of the plan.

(102.MIN/sc)

Bender

November 10, 1987

DRAFT

MEMORANDUM OF AGREEMENT

THIS AGREEMENT is entered into by and between the Iowa Department of Natural Resources (hereinafter "DEPARTMENT") and the University of Northern Iowa (hereinafter "UNIVERSITY") this _____ day of October, 1987.

W I T N E S S E T H:

WHEREAS, the Legislature has constituted authority within the DEPARTMENT to develop a comprehensive plan for the establishment of a Small Business Assistance Center for the management of solid and hazardous substances (hereinafter "CENTER"); and

WHEREAS, the Legislature has specifically identified UNIVERSITY as the site for housing the CENTER and appropriated \$50,000 to UNIVERSITY for implementation; and

WHEREAS, the Legislature has further mandated that a plan for establishing this CENTER be presented to the General Assembly on or before January 15, 1988; and

WHEREAS, DEPARTMENT is desirous of assistance from UNIVERSITY in its obligation to provide a plan for the CENTER; and

WHEREAS, UNIVERSITY is desirous of demonstrating a spirit of cooperation with DEPARTMENT by taking the lead in construction of a model plan;

NOW, THEREFORE, in consideration of the mutual promises and covenants hereinafter set forth, the parties agree as follows:

1. Plan Contents. UNIVERSITY will provide an initial plan that covers organizational details, CENTER objectives, and budget projections for the anticipated functions of the CENTER in subsequent years. The plan shall also provide that the CENTER'S programs include:
 - a. Providing information regarding the safe use and economic management of solid and hazardous substances to small businesses which generate the substances.
 - b. Dissemination of information to public and private agencies regarding state and federal solid and hazardous substances regulations, and assistance in achieving compliance with those regulations.
 - c. Advisement and consultation regarding the proper storage, handling, treatment, reuse, recycling, and disposal of solid and hazardous substances.
 - d. Identification of the advantages of proper substance management relative to operational costs of a particular small business.
 - e. Assistance in the providing of capital formation in order to comply with state and federal regulations.

2. Time Schedule. An initial draft of the plan will be prepared by UNIVERSITY for review by DEPARTMENT on or before December 10, 1987. The final plan document will be completed on or before January 15, 1988.

3. Cooperative Effort. The cooperation of representatives of the parties is essential at all points in the planning and implementation of the CENTER'S activities to the end that the CENTER may become a model for such centers throughout the Nation. In the spirit of such cooperation, UNIVERSITY will not charge DEPARTMENT for its out-of-pocket costs in devising the plan.

4. DEPARTMENT Obligations. In addition to its agreement to cooperate fully with UNIVERSITY in the preparation and implementation of a satisfactory plan for the CENTER, DEPARTMENT agrees to use its best efforts to secure immediate up-front payment to UNIVERSITY of the \$50,000 appropriation provided for the initial operation of the CENTER.

5. This Agreement embodies all of the understandings and obligations between the parties with respect to the subject matter hereof. No amendment or modification of this Agreement shall be valid or binding upon the parties unless made in writing and signed on behalf of each of the parties.

IN WITNESS WHEREOF, the parties have caused this Agreement to be signed by their duly authorized agents on the day and year first above written.

DEPARTMENT OF NATURAL RESOURCES

UNIVERSITY OF NORTHERN IOWA
(CENTER)

By: _____
Larry J. Wilson, Director

By: _____
Richard H. Stinchfield

Date: _____

Date: _____

ENVIRONMENTAL PROTECTION COMMISSION

ITEM

15

DECISION

EMERGENCY RULE ADOPTION -- CHAPTER 144, HOUSEHOLD HAZARDOUS MATERIALS

The attached rules are intended to implement Part Five of the Groundwater Protection Act concerning household hazardous materials. It is being recommended that the rules be emergency adopted and implemented to provide early implementation of this important public information program.

If approved, the rules could become effective upon filing with the Administrative Rules Coordinator.

The rules provide a new Chapter 144 of the Commission's rules and identify the display area labelling and consumer information requirements for retailers of household hazardous products.

Mike Murhpy
November 2, 1987

ENVIRONMENTAL PROTECTION COMMISSION [567]
Emergency Adopted Rule

Pursuant to the authority of 1987 Iowa Acts, House File 631, sections 505 and 506, the Environmental Protection Commission and the Director of the Department of Natural Resources emergency adopt a new Chapter 144, "Household Hazardous Materials."

1987 Iowa Acts, House File 631, Part Five requires retailers that sell household hazardous materials to affix labels which identify display areas of these materials and to make available consumer information booklets and bulletins pertaining to the proper use and disposal of household hazardous materials. These rules carry out duties imposed by this legislation on the Environmental Protection Commission and the Department of Natural Resources to identify products which are considered to be household hazardous products, and to establish specifications for the display labels and the content of the consumer information booklets and bulletins.

In compliance with the Iowa Code section 17A.4(2), the Department finds that public notice and participation are unnecessary in that the Department has extensively consulted with associations which represent affected retailers to obtain input in developing these rules. Public notice and participation are also contrary to the public interest because customers deserve prompt information pertaining to the identity and proper use of household hazardous materials. This emergency adoption in conjunction with usual effective date requirements will allow an effective date of January 20, 1988. This date will accommodate efforts of retailers to comply with the requirements of these rules and still result in relatively prompt dissemination of information to customers.

In accordance with Iowa Code section 17A.31, notice is hereby given that these rules may have an impact on small business. While this possibility exists, the Department has made a concerted effort to comply with legislative provisions requiring consultation with all known retailer associations. These rules are acceptable to these associations.

These rules are adopted by the Environmental Protection Commission and the Director of the Department of Natural Resources on this date, and will become effective on January 20, 1988.

These rules are intended to implement 1987 Iowa Acts, House File 631, Part Five.

November 2, 1987 DRAFT

Chapter 144
Household Hazardous Materials

567--144.1(455F) Scope. This chapter is intended to implement provisions of Iowa Code Chapter 455F. The Act requires retailers that sell household hazardous materials to affix display area labels in a prominent location on or near the display area of a household hazardous material.

The Act requires retailers to maintain and prominently display consumer information booklets which provide information on the proper use of household hazardous materials, and specific instructions for the proper disposal of certain substance categories. Additionally, retailers are required to make available consumer information bulletins about household hazardous materials. Manufacturers or distributors of household hazardous materials who authorize independent contractor retailers to sell products of the manufacturer or distributor on a person-to person basis are required to provide each independent contractor retailer with sufficient quantities of the booklet. The independent contractor retailer is to provide a copy of the booklet to the customer at the time of the sale.

The Act requires the environmental protection commission to adopt rules which establish a uniform display area label to be used by retailers. The environmental protection commission also must adopt rules which designate the type and amount of information to be included in the consumer information booklets and bulletins. The booklets, bulletins and labels are available free from DNR, but the rules allow the retailers to provide their own.

This chapter contains rules identifying products which are considered to be household hazardous products, the minimum size, color and content of labels which identify products, the placement of display area labels and informational signs as well as prescribing the general information to be included in consumer information booklets.

567--144.2(455F) Definitions.

"Commission" means the environmental protection commission.

"Department" means the department of natural resources.

"Display area label" means the signage used by a retailer to mark a household hazardous material display area as prescribed by the department.

"Informational Signs" Means signs which explain the household hazardous materials program, the significance of the display area labels and direct consumers to the location of informational booklets or other information available in the store.

"Manufacturer" means a person who manufactures or produces a household hazardous material for resale in this state.

"Retailer" means a person offering for sale or selling a household hazardous material to the ultimate consumer, within the state.

"Wholesaler" or "Distributor" means a person other than a manufacturer or manufacturer's agent who engages in the business of selling or distributing a household hazardous material within the state, for the purpose of resale.

567--144.3 (455F) Household hazardous materials.

144.3(1) Any brand, grade, size, or volume of the following products constitute household hazardous materials:

- (a) motor oils and motor oil additives,
- (b) motor oil filters,
- (c) gasoline additives,
- (d) diesel fuel additives,
- (e) degreasers,
- (f) waxes and polishes (excluding nail polish),
- (g) solvents (excluding water),
- (h) paints (excluding latex-based paints),
- (i) lacquers,
- (j) thinners (excluding water),
- (k) caustic household cleaners,
- (l) spot and stain removers with a petroleum base,
- (m) petroleum-based fertilizers,

144.3(2) Exemptions. A household hazardous material does not include laundry detergents or soaps, dish washing compounds, chlorine bleach, personal care products, personal care soaps, cosmetics, animal and human medications, and pharmaceuticals.

567--144.4 (455F) Labeling and sign requirements.

144.4(1) Specifications.

a. The display area label shall be at least 7/8"x 7/8" in size and shall be printed with the household hazardous materials program symbol in black on a fluorescent yellow background as shown below.



b. Informational signs shall be at least 8 1/2" X 11" and must contain a copy of the symbol of at least 5" in size. The sign shall explain the significance of the shelf label, the relationship of improper disposal of household hazardous materials to the contamination of groundwater, and direct consumers to the location of informational materials in the store.

144.4(2) General requirements. Retailers required to be permitted under 455F.7 shall affix display area labels meeting the specifications of 144.4(1)a immediately adjacent to the price information at the location where the household hazardous material is displayed for sale in their retail outlet. Where products are individually price marked with no corresponding shelf pricing information, the labels shall be affixed immediately in front of, above or below the product displays. All labels must be in locations where they can easily be seen by consumers. Where the same product from the same manufacturer is offered in a variety of sizes or colors on a single shelf, the display area labels may be spaced up to 2 feet apart on the shelf; or if the shelf is four feet or less in length, a single label on each shelf is acceptable if an informational sign is placed above the display rack.

Retailers are not required to label shelves which are in an enclosed area that is not accessible to the consumer, but the retailer must provide copies of the informational booklets and maintain a list of products sold which are household hazardous materials adjacent to an informational sign. These materials must be at the location where the consumer picks up the products for purchase.

144.4(3) Information Signs. These signs must be displayed at locations in the store close to shelves where household hazardous materials are offered for sale and in the location where informational materials are available. The informational signs are not required to be placed at every location where products are sold, but they should be displayed at areas where there are concentrations of such products, and where required by the provisions of 144.4(2). The locations of the signs shall be such that they will be clearly visible to customers.

144.4(4) Availability. Retailers are responsible for assuring that labels and signs are all located properly in accordance with the provisions of 144.4(2) and 144.4(3). Retailers may print their own display area labels so long as they are identical to

those provided by the department. Retailers may print their own information signs so long as they are at least the same size and contain all of the information found on those provided by the department. Retailers may also obtain labels and signs from the Department. Order forms for these materials are available on request from the department.

144.4(5) Variances. Retailers wishing to use labels or signs other than as required by this chapter must request and receive from the department a variance from these rules, provided however that a variance is not required to use a label which is larger in overall dimensions, or informational signs which are larger than those required by this chapter.

567--144.5(455F) Consumer information material.

144.5(1) Required. All retailers, wholesalers or distributors required to be permitted under 455F.7 shall display the consumer information material described in 144.5(2) and provide it to the public on request. Manufacturers or distributors of household hazardous materials who authorize independent contract retailers to sell products on a person-to-person basis are required to provide each independent contractor with sufficient quantities of the materials described in 144.5(2), as well as a list of household hazardous materials offered for sale, to be disseminated to their customers. All materials shall be made available to customers at no charge.

144.5(2) Contents. Consumer information booklets available from the department shall contain at a minimum the following types of information: Information on the kinds of products considered to be household hazardous materials, options for use and the proper disposal of household hazardous products, emergency phone numbers in case of a spill, and an explanation of the groundwater concerns related to the household hazardous materials program. Retailers may print their own information booklets so long as the text of the booklets is identical to that provided by the department. The booklets may contain original graphics and the identity of the retailer as a means to customize the booklet, except that the household hazardous materials program symbol must be printed on the cover page of any booklets published after the effective date of these rules. The booklet provided by the department will be subject to periodic updates as the program develops, and may include space for the retailer to include their own name or logo.

144.5(3) Bulletins. Periodically, the department may provide bulletins or other forms of public information materials for distribution to enhance public understanding of the program and their participation in it. The bulletins may also cover special

areas of concern, new developments on disposal or product options.

144.5(4) Availability. Retailers permitted under 455F.7 may obtain consumer information materials for distribution to their customers by filling out an order form. Order forms and booklets are available at no charge upon request to the department.

Date

Larry J. Wilson, Director

ENVIRONMENTAL PROTECTION COMMISSION [567]

Emergency Adopted Rule

Pursuant to the authority of 1987 Iowa Acts, House File 631, sections 505 and 506, the Environmental Protection Commission and the Director of the Department of Natural Resources emergency adopt a new Chapter 144, "Household Hazardous Materials."

1987 Iowa Acts, House File 631, Part Five requires retailers that sell household hazardous materials to affix labels which identify display areas of these materials and to make available consumer information booklets and bulletins pertaining to the proper use and disposal of household hazardous materials. These rules carry out duties imposed by this legislation on the Environmental Protection Commission and the Department of Natural Resources to identify products which are considered to be household hazardous products, and to establish specifications for the display labels and the content of the consumer information booklets and bulletins.

In compliance with the Iowa Code section 17A.4(2), the Department finds that public notice and participation are unnecessary in that the Department has extensively consulted with associations which represent affected retailers to obtain input in developing these rules. Public notice and participation are also contrary to the public interest because customers deserve prompt information pertaining to the identity and proper use of household hazardous materials. This emergency adoption in conjunction with usual effective date requirements will allow an effective date of January 20, 1988. This date will accommodate efforts of retailers to comply with the requirements of

these rules and still result in relatively prompt dissemination of information to customers.

In accordance with Iowa Code section 17A.31, notice is hereby given that these rules may have an impact on small business. While this possibility exists, the Department has made a concerted effort to comply with legislative provisions requiring consultation with all known retailer associations. These rules are acceptable to these associations.

These rules are adopted by the Environmental Protection Commission and the Director of the Department of Natural Resources on this date, and will become effective on January 20, 1988.

These rules are intended to implement 1987 Iowa Acts, House File 631, Part Five.

Chapter 144

Household Hazardous Materials

567--144.1(455F) Scope. This chapter is intended to implement provisions of Iowa Code Chapter 455F. The Act requires retailers that sell household hazardous materials to affix display area labels in a prominent location on or near the display area of a household hazardous material.

The Act requires retailers to maintain and prominently display consumer information booklets which provide information on the proper use of household hazardous materials, and specific instructions for the proper disposal of certain substance categories. Additionally, retailers are required to make available consumer information bulletins about household hazardous materials. Manufacturers or distributors of household hazardous materials, who authorize independent contractor retailers to sell products of the manufacturer or distributor on a person-to-person basis, are required to provide each independent contractor retailer with sufficient quantities of the booklet. The independent contractor retailer is to provide a copy of the booklet to the customer at the time of the sale.

The Act requires the environmental protection commission to adopt rules which establish a uniform display area label to be used by retailers. The environmental protection commission also must adopt rules which designate the type and amount of information to be included in the consumer information booklets and bulletins. The booklets, bulletins and labels are available free from DNR, but the rules allow the retailers to provide their own.

This chapter contains rules identifying products which are considered to be household hazardous products, the minimum

size, color and content of labels which identify products, the placement of display area labels and informational signs as well as prescribing the general information to be included in consumer information booklets.

567--144.2(455F) Definitions.

"Commission" means the environmental protection commission.

"Department" means the department of natural resources.

"Display area label" means the signage used by a retailer to mark a household hazardous material display area as prescribed by the department.

"Informational signs" means signs which explain the household hazardous materials program, the significance of the display area labels and direct consumers to the location of informational booklets or other information available in the store.

"Manufacturer" means a person who manufactures or produces a household hazardous material for resale in this state.

"Retailer" means a person offering for sale or selling a household hazardous material to the ultimate consumer, within the state.

"Wholesaler" or "distributor" means a person other than a manufacturer or manufacturer's agent who engages in the business of selling or distributing a household hazardous material within the state, for the purpose of resale.

567--144.3(455F) Household hazardous materials.

144.3(1) Any brand, grade, size or volume of the following products constitute household hazardous materials:

- (a) motor oils and motor oil additives,
- (b) motor oil filters,

- (c) gasoline additives,
- (d) diesel fuel additives,
- (e) degreasers,
- (f) waxes and polishes (excluding nail polish),
- (g) solvents (excluding water),
- (h) paints (excluding latex-based paints),
- (i) lacquers,
- (j) thinners (excluding water),
- (k) caustic household cleaners,
- (l) spot and stain removers with a petroleum base,
- (m) petroleum-based fertilizers.

144.3(2) Exemptions. A household hazardous material does not include laundry detergents or soaps, dishwashing compounds, chlorine bleach, personal care products, personal care soaps, cosmetics, animal and human medications, and pharmaceuticals.

567--144.4(455F) Labeling and sign requirements.

144.4(1) Specifications.

(a) The display area label shall be at least 7/8" x 7/8" in size and shall be printed with the household hazardous materials program symbol in black on a fluorescent yellow background as shown below.

(b) Informational signs shall be at least 8-1/2" x 11" and must contain a copy of the symbol of at least 5" in size. The sign shall explain the significance of the shelf label, the relationship of improper disposal of household hazardous materials to the contamination of groundwater, and

direct consumers to the location of informational materials in the store.

144.4(2) General requirements. Retailers required to be permitted under Iowa Code section 455F.7 shall affix display area labels meeting the specifications of 144.4(1)a immediately adjacent to the price information at the location where the household hazardous material is displayed for sale in their retail outlet. Where products are individually price marked with no corresponding shelf pricing information, the labels shall be affixed immediately in front of, above or below the product displays. All labels must be in locations where they can easily be seen by consumers. Where the same product from the same manufacturer is offered in a variety of sizes or colors on a single shelf, the display area labels may be spaced up to two feet apart on the shelf; or if the shelf is four feet or less in length, a single label on each shelf is acceptable if an informational sign is placed above the display rack.

Retailers are not required to label shelves which are in an enclosed area that is not accessible to the consumer, but the retailer must provide copies of the informational booklets and maintain a list of products sold which are household hazardous materials adjacent to an informational sign. These materials must be at the location where the consumer picks up the products for purchase.

144.4(3) Information signs. These signs must be displayed at locations in the store close to shelves where household hazardous materials are offered for sale and in the location where informational materials are available. The informational signs are not required to be placed at every location where products are sold, but they should be displayed at areas where there are concentrations of such

products, and where required by the provisions of 144.4(2). The locations of the signs shall be such that they will be clearly visible to customers.

144.4(4) Availability. Retailers are responsible for assuring that labels and signs are all located properly in accordance with the provisions of 144.4(2) and 144.4(3). Retailers may print their own display area labels so long as they are identical to those provided by the department. Retailers may print their own information signs so long as they are at least the same size and contain all of the information found on those provided by the department. Retailers may also obtain labels and signs from the department. Order forms for these materials are available on request from the department.

144.4(5) Variances. Retailers wishing to use labels or signs other than as required by this chapter must request and receive from the department a variance from these rules, provided however that a variance is not required to use a label which is larger in overall dimensions, or informational signs which are larger than those required by this chapter.

567--144.5(455F) Consumer information material.

144.5(1) Required. All retailers, wholesalers or distributors required to be permitted under Iowa Code section 455F.7 shall display the consumer information material described in 144.5(2) and provide it to the public on request. Manufacturers or distributors of household hazardous materials who authorize independent contract retailers to sell products on a person-to-person basis are required to provide each independent contractor with sufficient quantities of the materials described in 144.5(2), as well as a list of household hazardous materials

added { offered for sale, to be disseminated to their customers. During the course of a sale of household hazardous material by a contractor retailer, the customer shall in the first instance be provided with a copy of both the list and the consumer information booklet. In subsequent sales to the same customer, the list and booklet shall be noted as being available if desired. All materials shall be made available to customers at no charge.

144.5(2) Contents. Consumer information booklets available from the department shall contain at a minimum the following types of information: Information on the kinds of products considered to be household hazardous materials, options for use and the proper disposal of household hazardous products, emergency phone numbers in case of a spill, and an explanation of the groundwater concerns related to the household hazardous materials program. Retailers may print their own information booklets so long as the text of the booklets is identical to that provided by the department. The booklets may contain original graphics and the identity of the retailer as a means to customize the booklet, except that the household hazardous materials program symbol must be printed on the cover page of any booklets published after the effective date of these rules. The booklet provided by the department will be subject to periodic updates as the program develops, and may include space for the retailer to include their own name or logo.

144.5(3) Bulletins. Periodically, the department may provide bulletins or other forms of public information materials for distribution to enhance public understanding of the program and their participation in it. The bulletins may also cover special areas of concern, new developments on disposal or product options.

144.5(4) Availability. Retailers permitted under Iowa Code section 455F.7 may obtain consumer information materials for distribution to their customers by filling out an order form. Order forms and booklets are available at no charge upon request to the department.

Date

Larry J. Wilson, Director

(EP144.RUL/sc)

ENVIRONMENTAL PROTECTION COMMISSION

ITEM 16

INFORMATION

PROPOSED CONTESTED CASE DECISION -- DENNIS GREINER

On February 16, 1987, the Department issued Administrative Order No. 87-FP-02 requiring Dennis Greiner and others to submit certified engineering plans regarding an unauthorized channel change on West Fork Crooked Creek in Washington County. Only Mr. Greiner pursued an appeal, and the hearing was conducted on June 30, 1987. Administrative Hearing Officer Amy Christensen Couch has rendered the attached proposed decision.

Mr. Greiner may appeal this proposed decision to the Commission if he chooses. In the absence of an appeal, the Commission may decide on its own motion to review the proposed decision. If there is no appeal or review of the proposed decision, it automatically becomes the final decision of the Commission.

Randy Clark
October 21, 1987

(I26.MIN/sc)

BEFORE THE IOWA DEPARTMENT OF NATURAL RESOURCES

IN THE MATTER OF:

G. HANK MAYER
WAYNE AND LEON VOGEL,
AND DENNIS GREINER:

)
)
) Admin. Order No. 87-FP-02
) DIA No. NHS 870147
) Findings of Fact,
) Conclusions of Law and Order
)

On February 16, 1987, the Iowa Department of Natural Resources (hereinafter Department) issued Administrative Order No. 87-FP-02 to G. Hank Mayer, Wayne and Leon Vogel, and Dennis Greiner. In the Order, the Department ordered Mr. Mayer, the Vogels and Mr. Greiner to submit certified engineering plans for a creek channel change on a flood plain.

Mr. Mayer, Mr. Greiner, and the Vogels appealed Administrative Order No. 87-FP-02. The Notice of Hearing set the hearing for June 30, 1987. Mr. Mayer and the Vogels subsequently withdrew their appeals, and on June 8, 1987, an Order was issued dismissing them from the appeal. Mr. Greiner continued as the only appellant.

Mr. Greiner filed his Petition on June 2, 1987. The Department filed its Answer on June 12, 1987.

The hearing was held on June 30, 1987 in the fourth floor conference room of the Wallace State Office Building, 900 E. Grand, Des Moines, Iowa 50319. Mr. Greiner appeared and represented himself. The Department was represented by Randall Clark. The undersigned hearing officer for the Iowa Department of Inspections and Appeals presided.

The parties were ordered to submit Briefs, which they did.

THE RECORD

The evidentiary record in this case consists of the recorded testimony of the witnesses, the above letters, pleadings and orders, the Briefs submitted by the parties, and the following Exhibits:

- Greiner Exhibit 1 - a copy of a soil conversation plan, a copy of a cancelled check, and a copy of a USDA contract
- Department Exhibit 1 - an application for a permit to construct in a floodway

- Department Exhibit 2 - a copy of a USGS topographic map
- Department Exhibit 3 - an aerial photograph
- Department Exhibit 4 - a referral report dated August 15, 1986
- Department Exhibit 5 - calculations dated 8/5/86
- Department Exhibit 6 - a memo dated March 24, 1987
- Department Exhibit 7 - a copy of 567 Iowa Administrative Code §70.4(2)

FINDINGS OF FACT

1. Mr. Dennis Greiner went to the United States Department of Agriculture Soil Conservation Service when he bought his farm, and told them he wanted to improve the land. The Soil Conservation Service (S.C.S.) prepared a plan for Mr. Greiner's land. Part of this plan, dated July 1968, directed Mr. Greiner to straighten the portion of Crooked Creek on his land. (Dept. Ex. 1; Greiner Ex. 1; testimony of Mr. Dennis Greiner).
2. Mr. Greiner followed the plan prepared by the SCS. He straightened the channel of the West Fork Crook Creek. The work was performed in the years 1968-1972. The work was completed in 1972. Mr. Greiner has maintained the number of acres of cropland directed in the plan. Mr. Greiner has left some of his land as wildlife habitat. (testimony of Mr. Greiner; Greiner Ex. 1; Dept. Exs. 2, 3, 5).
3. Mr. Greiner was unaware that he was required by Iowa statute to submit an application for his construction to the Iowa Department of Natural Resources (then the Natural Resources Council), hereinafter department. (testimony of Mr. Greiner).
4. The only government office in Mr. Greiner's county in 1968 was the SCS office. (testimony of Mr. Greiner).
5. The SCS did not direct Mr. Greiner to submit an application to the Iowa Natural Resources Council. (testimony of Mr. Greiner).
6. Mr. Greiner has not submitted certified engineering plans which are a necessary part of the application for a permit to construct on a flood plain. (testimony of Mr. Greiner; Mr. Dave Allen; Dept. Ex. 1).
7. The part of Mr. Greiner's land containing the project in question is on the flood plain of the West Fork Crooked Creek. (testimony of Mr. Allen; Dept. Exs. 1,2,3,4).

8. The original channel length was 5300 feet. The length of the straightened channel is 3400 feet. There was a 36% reduction in length. At the lower end of the channel change project on Mr. Greiner's land West Fork Crooked Creek has a drainage area of 45 square miles. (testimony of Mr. Allen; Dept. Ex. 4,5).
9. The department needs certified engineering plans as a part of the application so that it can evaluate whether the project meets departmental criteria. (testimony of Mr. Dave Claman).
10. It is unknown exactly how much the engineering plans for Mr. Greiner's project will cost, but it is likely that they will cost at least \$3000.00 - \$5000.00. (testimony of Mr. Greiner, Mr. Claman).

CONCLUSIONS OF LAW, DECISION AND ORDER

Iowa Code Section 455A.33 (1966), provided in part, that in the event any person desires to erect or make, or to suffer or permit, a structure, dam, obstruction, deposit or excavation other than a dam, constructed and operated under the authority of chapter 469 as amended, to be erected, made, used or maintained in or on any floodway or flood plains, such person shall file a verified written application with the council, setting forth the material facts, and the council after an investigation or hearing, shall enter an order, determining the fact and permitting or prohibiting the same, upon such terms and conditions as it may prescribe.

Although the Department developed an in-house "Procedural Guide" with limits on when Council approval was required for channel changes, the department did not validly promulgate rules regarding channel changes. Therefore, any requirement regarding when an application for a permit for a channel change must be made must come from the statute itself.

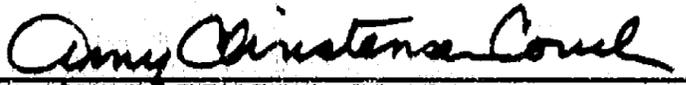
In 1968, the Iowa Supreme Court interpreted §455A.33. The Court stated that the code section required any person who desired to erect a structure on a flood plain to file an application, and that completion of the structure prior to submitting the application did not excuse one from conforming with the statute's requirement. Iowa Natural Resources Council v. Van Zee, 158 N.W.2d 111, 116 (Iowa 1968). The Court stated that §455A.33 applied to all structures erected subsequent to the effective date of the act. The Court further stated "The council contends defendant should be required to file the application for a permit even though the structure has been completed so that the orderly procedure set out in chapter 455A can be effectively followed. We agree." Van Zee, supra, at 119.

Therefore, from 1968 through 1972, when Mr. Greiner did his construction, he was required by the statute to file a verified written application with the department. He did not do so. Even though his construction is long completed, the department still has the authority to require him to file an application. Van Zee, supra.

Several mitigating factors exist. Mr. Greiner went to the only government agency of which he was aware, the U.S. Dept. of Agriculture Soil Conservation Service. The SCS prepared the plan which directed him to do the construction which is now being challenged by the department. The construction was completed in 1972. Mr. Greiner was unaware of the requirement that he submit an application to the state agency. There were no state agency offices in Mr. Greiner's county during 1968-1972. The U.S. Soil Conservation Service did not direct Mr. Greiner to submit an application to the state. As Mr. Greiner argued, requiring him to submit an application at considerable expense nearly twenty years after he began his construction which he did at the direction of a U.S. government agency seems highly unfair. Nevertheless, the department clearly has the authority to require Mr. Greiner to submit an application. Unlike a district court judge, this hearing officer has no equitable authority.

Therefore, it is hereby ORDERED that Administrative Order No. 87-FP-02 is affirmed with respect to Mr. Dennis Greiner.

DATED THIS 19th DAY OF *October*, 1987.


AMY CHRISTENSEN COUCH
Hearing Officer
Iowa Department of Inspections
and Appeals
Lucas State Office Building
Second Floor
Des Moines, Iowa 50319

ACC/sac

cc: Dennis Greiner
Randy Clark

IOWA DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION COMMISSION

ITEM 17

DECISION

BREMER COUNTY CONTESTED CASE - PROCEDURAL MOTION

Bremer County has appealed the department's denial of a permit to install a Pacherm Pit Burner at their sanitary landfill. That matter has been referred to the hearing officer for normal contested case procedures. On October 26, 1987, the County requested that this matter be presented directly to the Commission rather than a hearing officer. The parties will be at the Commission meeting to present their respective positions on this procedural issue, and the Commission is asked to decide whether it will hear the case directly or whether it should be heard by a hearing officer in the first instance.

Mike Murphy
Government Liaison Bureau
October 28, 1987

87301DNR0004

BREMER COUNTY BOARD OF SUPERVISORS

415 East Bremer Avenue
Waverly, Iowa 50677

COPY

1st Dist. - Ralph W. Juhl
2nd Dist. - Paul Murphy
3rd Dist. - Steven C. Reuter

Telephone
319-262-8848

October 26, 1987

Mr. Larry Wilson, Director
Dept. of Natural Resources
Wallace State Office Building
Des Moines, IA 50319

RE: Bremer County - Pit Burner

Dear Mr. Wilson:

Reference my letter of October 2, 1987 and the reply by Mr. Michael Murphy dated October 7 on the above subject.

Subsequent conversations with Mr. Landa tells me that our request will be presented to a hearing officer who will then make his recommendations to the Commission. This is time consuming and I believe unnecessary. It is our opinion that the request is not that involved as to require the full formal procedure.

After a lengthy discussion with your Mr. Allen Stokes, it is requested that our appeal be presented directly to the Commission at its November meeting.

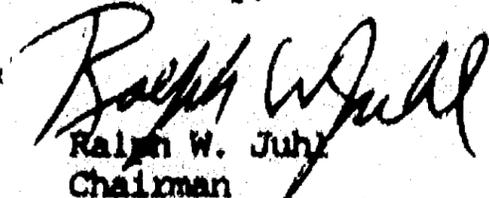
As our original request indicated, we are asking only for a developmental permit for a fixed period of time in order that the proposed installation can be evaluated and made to comply with the regulations to be established. Mr. Stokes indicated that such conditional permits have been previously granted. In the approval notice we would like to have the limiting conditions set forth to be used as guidelines in the development of our project.

All governmental agencies are trying hard to find a suitable system of trash disposition that they can afford and that will meet the Clean Air Standards. As we see the problem, we are in the development stage and need to try various different systems before a suitable final answer can be developed.

This Board is sufficiently convinced that the proposed equipment can meet the requirements and is worth the effort. Further, the county will finance the project from local funds.

Your prompt approval will be appreciated in order that we may proceed.

Sincerely,


Ralph W. Juhl
Chairman

cc: Allen Stokes
Michael Murphy



TERRY E. BRANSTAD, GOVERNOR

DEPARTMENT OF NATURAL RESOURCES
LARRY J. WILSON, DIRECTOR

October 7, 1987

Mr. John Terrell
Department of Inspections and Appeals
Lucas State Office Building
LOCAL

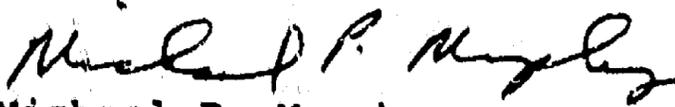
RE: Bremer County Board of Supervisors

Dear Mr. Terrell:

Enclosed please find a Notice of Appeal from Bremer County Board of Supervisors. The subject of the appeal is a denial of a permit to install equipment or control equipment, a copy of which is also enclosed. This subject is governed by Iowa Code Chapter 455B, Division II, and 567--20-29, Iowa Administrative Code.

Please initiate contested case procedures in this matter. Mark Landa will be representing Department staff in this case and future correspondence or other communications should be directed to Mr. Landa.

Sincerely,


Michael P. Murphy
Chief, Government Liaison Bureau

Enclosures

cc: FOI
DNR, EPD
✓ Mark Landa
Ralph W. Juhl - Waverly

BREMER COUNTY BOARD OF SUPERVISORS

415 East Bremer Avenue
Waverly, Iowa 50677

1st Dist. - Ralph W. Juhl
2nd Dist. - Paul Kempter
3rd Dist. - Steven C. Ruster

Telephone
319-382-5848

October 2, 1987

RECEIVED BY

OCT 5 1987

DIRECTORS OFF.

Mr. Larry Wilson, Director
Dept. of Natural Resources
Wallace State Office Building
Des Moines, IA 50319

RE: Bremer County - Pit Burner

Dear Mr. Wilson:

On August 11, 1987 we delivered an application for a permit to install a Pactherm Pit Burner at our sanitary landfill. On September 24, 1987 we received a denial (copy enclosed) from your Air Quality Section on the basis that the proposed system cannot be operated to comply with the existing emissions rules. No further details were provided.

According to subrule 567-55.7(2) of the Administrative Code, we have the right to appeal if submitted within 30 days. We are hereby submitting our appeal of the ruling and request a hearing before the Environmental Protection Commission at its next regular meeting.

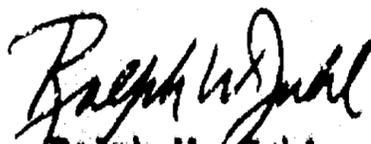
It is our opinion that the proposal has merit and can be made to comply with the air emission standards for rural areas. We admit that all details have not been worked out and that a period of operation and testing is in order. Because of this, we are asking for a developmental permit covering 3 years to allow your department to make the proper investigation and evaluation and, if possible, develop a testing procedure.

The system proposed seems to be the only one that can possibly be built within the fiscal capabilities of a rural county. All others using separators, pelletizers and boilers to convert trash to energy are way beyond our financial means. Further, there are no sources within reasonable distance that will buy the prepared fuel.

A similar situation exists in the State of Tennessee. That state agency must see some possible benefits or they would not offer to assist in testing.

Your favorable consideration of this request will be appreciated.

Sincerely,



Ralph W. Juhl
Chairman



INCINERATOR

TERRY E. BRANSTAD, GOVERNOR

DEPARTMENT OF NATURAL RESOURCES
LARRY J. WILSON, DIRECTOR

September 24, 1987

CERTIFIED MAIL

Mr. Ralph Juhl
Chairman, Bremer County Board of Supervisors
415 East Bremer Avenue
Waverly, Iowa 50677

SUBJECT: Pit Burner

Dear Mr. Juhl:

This letter is in response to a request for a permit to install or alter equipment or control equipment. Subrule 567--22.1(1) of the Iowa Administrative Code (IAC) requires that each person planning to install, reconstruct, construct or alter equipment or control equipment capable of emitting air contaminants must obtain a permit from this Department before starting construction.

The proposal was for a forced-air pit burner to be operated at your county landfill. The described system has no provision for the control of particulate emissions and visible air contaminants. It has been determined that the described system does not have the potential to be operated in compliance with the emission rules. The permit has been denied.

The decision for denial has been made without prejudice, and you may again apply after revisions have been made to meet the objections specified as the reason for the denial.

You may appeal this determination of the department by filing a notice of appeal within thirty (30) days from receipt of this letter, pursuant to subrule 567--55.7(2) of the Iowa Administrative Code. You should address your appeal to the Executive Director, Department of Natural Resources, 900 East Grand Avenue, Des Moines, Iowa 50319. We are returning your permit application with the denial indicated.

Sincerely,

A handwritten signature in cursive script that reads "Michael Hayward".

MICHAEL HAYWARD
AIR QUALITY SECTION

MH:ka

Enclosure

cc: Mark Landa, DNR
L.W. Kehe, Cedar Valley Engr. Co.
Field Office 1

IOWA DEPARTMENT OF WATER, AIR AND WASTE MANAGEMENT

APPLICATION AND PERMIT TO INSTALL OR ALTER EQUIPMENT OR CONTROL EQUIPMENT

IOWA DEPARTMENT OF WATER, AIR AND WASTE MANAGEMENT	
Permit No.	Permit Denied
Plant No.	09-01-011
Project No.	87-112

AIR QUALITY PROGRAM

Read instructions on reverse
Print in ink or typewrite

APPLICANT INFORMATION	1 FIRM NAME Bremer County		2 PERSON TO CONTACT Ralph Juhl	
	3 MAILING ADDRESS 415 E. Bremer Ave.		City Waverly	State Zip Code IA 50677
	4 EQUIPMENT LOCATION ADDRESS R.R. 3 -- Section 23-91-13, Warren Township			

PROCESS OR SOURCE INFORMATION	5 TYPE Pactherm Pit Burner		6 CAPACITY (pounds/hour) (tons/year)	
	7 MAKE & MODEL 20FT 2036	<input checked="" type="checkbox"/> New <input type="checkbox"/> Modification	20,000	15,000 - 16,000

POLLUTION CONTROL EQUIPMENT INFORMATION	8 TYPE Top Air Curtain		9 EFFICIENCY (No Information)		10 FLOW RATE (SCFM) (No Information)	
	11 MAKE & MODEL Driall Air Curtain Destructor -- ACD42					
	12 CONSTRUCTION SCHEDULE Start Date As soon as permits are issued		Completion Date 120 days after		13 EMISSIONS (specify units) Before Control After Control (No Information)	

ENGINEER SUBMITTING PLANS	14 NAME L. W. Kehe <i>L. W. Kehe</i>		Phone (319) 352-3213	Iowa P.E. No. 2175
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CERTIFICATION	15 I am the owner or the owner's employee responsible for this installation.			
	Signature <i>Ralph Juhl</i>	Name Ralph Juhl	Date 8/5/87	Title Chairman, Board of Supervisors

WAMM USE ONLY	
This equipment has been evaluated for conformance with rule (a) _____ of the Iowa Water, Air and Waste Management Commission and found to have the potential to comply. This permit is issued subject to the conditions listed on the reverse.	
Under Direction of the Executive Director	
PROGRAM OPERATIONS DIVISION	
Date _____	

IOWA DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION COMMISSION

ITEM 18

DECISION

REFERRALS TO THE ATTORNEY GENERAL

The Director requests the referral of the following to the Attorney General for appropriate legal action. Litigation reports have been provided to the Commissioners and are confidential pursuant to Iowa Code section 22.7(4).

IBP, inc./Jim Langenfeld - solid waste/water pollution
JTM Industries/Delbert Leamer - solid waste/penalty collection
City of Ankeny - wastewater
Big Rock Tap - drinking water/penalty collection
City of Washington - wastewater
Finlan Landfill - solid waste/tonnage fee collection

Mike Murphy
November 2, 1987

DRAFT 4

*Public Participation - EPC Commission Meeting -
November 17, 1987*

Presentation to the
ENVIRONMENTAL PROTECTION COMMISSION

November 17, 1987

Good morning. My name is Ted Yancecek, I am public affairs counsel for the Iowa Farm Bureau Federation.

Last month the Commission took action with respect to a rule for the registration of agricultural drainage wells (ADWs). As the rule was adopted utilizing emergency procedures, bypassing the normal period for public comment and review, it has become necessary to come before you during this period for public participation to express our concerns.

The rule itself is straight forward, however it disguises a problem. The rule simply requires owners of ADWs to register their wells with the department by January 1 on a form provided by the department. The problem is not the rule, the problem is the form and the accompanying instructions.

The form asks for information that may not be readily available to the landowner. Items 4 through 8 go beyond the registration requirement imposed by the Groundwater Protection Act and for that matter the rule of the department. Admittedly, the information requested would be of value to the department of agriculture & land stewardship in its study of drainage wells.

The instructions indicate that failure to register will render a landowner ineligible for financial incentives. What incentives? House File 631 does not require the department to provide financial incentives, incentive payments are merely permissive. Furthermore, it is not the department of natural

resources that makes that decision, it is the department of agriculture & land stewardship that will determine if financial incentives will be made available.

Farmers are faced with a form that is overly broad in scope and instructions that are at best misleading, if not in error. The form should be simple and encourage registration. This form is not simple and in my opinion will discourage compliance, a result we are certainly not advocating.

The instructions further predict the result of the DALIS study of drainage wells stating that, "Since it is quite possible that existing drainage wells will have to be closed or substantially modified, drainage well owners should preserve their right to be eligible for that financial assistance by registering their wells by January 1, 1988."

Perhaps they will have to be closed, perhaps not. But again the bothersome point is that the instructions are misleading.

Farm Bureau leaders from north central Iowa have been meeting over the past months to discuss ADWs. Last week they reviewed the form and instructions and noted that there was no definition of ADW on the form. Granted, the rule defines an ADW, but the information in the hands of the well owner is silent. They raised the issue: are natural sinkholes that are tiled to, or improved, ADWs?

It is just this type of question that would have been asked in the normal rulemaking process. Further, the rationale for emergency adoption is not persuasive. Granted, January 1 is fast approaching, but the law was passed by the General Assembly in May



and there was little doubt that the Governor would sign the bill. I recognize that the department has been given a great deal of responsibility and that there are limits on staff time, but this alone does not suffice as an explanation.

The department should revise the form to indicate that in order to remain eligible for financial incentives, if any are made available, that the landowner must answer items 1 through 3. Secondly, items 4 through 8 need not be answered however the information would be of value to the DAL3 in its study of drainage wells.

Public participation is critical if the Groundwater Protection Act is to be properly implemented. An ad hoc advisory committee has been established on the topic of well permits and grants to counties for well testing and well abandonment. I am confident that the members are all upstanding individuals however from this listing, there appears to be no one representing the regulated public. Further, it is my understanding that an ad hoc committee on the topic of groundwater quality standards has also met. Is the public, or for that matter the Commission, represented or notified of these meetings? Are there other committees studying and proposing regulations?

The department has a difficult task in developing the programs assigned to it through the Groundwater bill, however the public will have no less difficult task in responding to these programs. The bottom line and the purpose for my appearance before you today is to urge the Commission and the department to seek input of the regulated public and to better establish a

constructive dialog. The public is not properly served if emergency rulemaking becomes the norm for implementation of the Groundwater Protection Act. The Act itself was the result of compromise and cooperation, an attitude which must continue if the goals of the bill are to be met.

Thank you.

Agricultural Drainage Well Registration Form
(Please print in ink or type)

- 1) LOCATION OF DRAINAGE WELL (Attach aerial photo if necessary-see instructions)

_____ 1/4 of the _____ 1/4, Section _____, T____N, R____, _____ County

- 2) NAME AND ADDRESS OF DRAINAGE WELL OWNER

Name _____

Street, RR or Box _____

City and State _____

Zip Code _____

Phone () _____

- 3) NAME AND ADDRESS OF AUTHORIZED AGENT
(leave blank if not appropriate)

Name _____

Street, RR or Box _____

City and State _____

Zip Code _____

Phone () _____

- 4) INDICATE BELOW THE AMOUNT OF LAND DRAINED BY THE DRAINAGE WELL

LAND OWNED BY THE WELL OWNER _____ ACRES

LAND NOT OWNED BY THE WELL OWNER _____ ACRES

TOTAL AMOUNT OF LAND DRAINED _____ ACRES

- 5) OF THE LAND DRAINED BY THE DRAINAGE WELL, GENERALLY WHAT PERCENTAGE IS IN CONTINUOUS ROW CROP (Include any set-aside acres that normally would be in row crop production) _____ %

- 6) WHAT TYPE OF DRAINAGE WATER ENTERS THE DRAINAGE WELL? CHECK ONE

TILE DRAINAGE
ONLY

SURFACE WATER
ONLY

BOTH TILE AND
SURFACE WATER

7) TO YOUR KNOWLEDGE, HOW CLOSE IS THE NEAREST WATER SUPPLY WELL FOR HUMAN CONSUMPTION TO THE DRAINAGE WELL? CHECK ONE.

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> |
| 1/8 mile
or less | 1/8 to
1/4 mile | 1/4 to
1/2 mile | 1/2 to
1 mile | 1 mile
or more |

8) HOW DEEP IS THE DRAINAGE WELL? _____ ft.

COMMENTS: _____

Signature of owner agent
(check one)

_____ Date

Instructions for Completing the Well Registration Form

Iowa's Groundwater Protection Act, passed in 1987, requires that all agricultural drainage wells be registered with the Iowa Department of Natural Resources by January 1, 1988. To register an agricultural drainage well, complete the registration form and mail to:

Drainage Well Coordinator
Department of Natural Resources
Wallace State Office Building
Des Moines, IA 50319

Questions on the form should be directed to the Drainage Well Coordinator at the above address or by calling (515)281-8693.

Agricultural drainage well owners who don't comply with the January 1, 1988 deadline will not be eligible to use the financial incentive money provided by the Legislature for implementing drainage well alternatives. Although it is not known at this time if agricultural drainage wells will have to be closed or modified, well owners should definitely consider it a possibility. Therefore, well owners should preserve their right to use such funds by meeting the registration deadline.

A separate registration must be completed for each drainage well. A brief explanation of each of the numbered items is given below. Items 1, 2 and 3 must be filled in correctly, so please double check this information prior to sending.

Item 1, Location of drainage well - The location should be given to the quarter-quarter section. If you are unsure of the exact quarter-quarter section, you can attach an ASCS crop photo with the location of the well indicated. Example: NW 1/4 of the NE 1/4 of Section 12, T 92 N, R 28 W, Humboldt County.

Item 2, Name and address of drainage well owner - The owner should be the title holder of record of the land on which the well is located and may be an individual(s), corporation, trust, etc.

Item 3, Name and address of authorized agent. An authorized agent is a person, company, etc. who is authorized by the well owner(s) to act on the owner's behalf in registering the drainage well and serve as the contact. An authorized agent might typically be a tenant, attorney, corporate officer, farm management company, etc.

Item 4, Indicate below the amount of land drained by the drainage well. Estimate the total amount of land drained by the well and of that amount, the amounts owned or not owned by the well owner. If the well owner owns all the land which drains into the well, place a "zero" in the second blank. When determining how much land the well drains, consider both tile drainage and overland flow. The acreage estimates do not have to be precise, but try to estimate to the nearest 10 acres.

Item 5, Of the land drained by the drainage well, generally what percentage is in continuous row crop? Estimate the percentage of the land that, in an average year, would be in continuous row crop production. Include set-aside acres that, in your opinion, would be in continuous row crop production if there were no farm programs. In estimating the percentage, consider the total amount of land as shown in item 4.

Item 6, What type of drainage water enters the drainage well? Drainage water typically enters a drainage well through a tile line connected to the well, through an opening at or near the ground level, or both. Please check the box which best describes the type of drainage water that normally enters the well. Tile lines which at some point directly intercept overland flow would be considered as carrying both tile drainage and surface water.

Item 7, To your knowledge, how close is the nearest water supply well for human consumption to the drainage well? In answering this question, the nearest water supply well should be considered as the nearest well supplying drinking water for humans. Do not consider wells used exclusively for such uses as irrigation or livestock watering.

Item 8, How deep is the drainage well? Give the depth of the well if known. If unknown and unable to reasonably determine such, indicate "unknown".

Comments. Use the comment lines to clarify any of the information in items 1-9.

Signature Block - The registration form must be signed by the drainage well owner or authorized agent to be a valid registration.

AGRICULTURAL DRAINAGE WELLS
QUESTIONS AND ANSWERS

Q: What is an agricultural drainage well?

A: An agricultural drainage well collects either surface runoff or tile drainage water from agricultural lands and channels it downward into the ground where it becomes part of the state's groundwater. Drainage wells are usually constructed to drain land that, due to economic reasons or the "lay of the land", can not be drained by the more common method of open ditches. Drainage wells are sometimes called sink wells or dry wells.

Q: Why the big concern over agricultural drainage wells now? They've been around for quite awhile.

A: Groundwater sampling is showing that agricultural chemicals are finding their way into the state's groundwater supplies. Since many Iowans depend upon groundwater for their drinking water, there is a real concern over what health effects will result from even minor amounts of fertilizers, herbicides and pesticides in the groundwater.

Agricultural drainage wells can channel these chemicals directly down into the groundwater and are likely a direct source of groundwater contamination. Any effort to maintain the quality of the state's groundwater supplies would be incomplete if agricultural drainage wells were ignored.

Q: Why do agricultural drainage wells have to be registered?

A. The Groundwater Protection Act, passed by the legislature in 1987, requires that all agricultural drainage wells be registered with the Department of Natural Resources by January 1, 1988. Registration is the first step in a program intended to eliminate groundwater contamination caused by agricultural drainage wells by 1995.

Q: Haven't agricultural drainage wells been registered before?

A. In 1983 and 1984, landowners were sent post cards inquiring as to the number and location of all wells on their property including drainage wells. This was an attempt to identify the number and types of wells state wide. In addition, the Environmental Protection Agency has done some inventorying in connection with their Underground Injection Control Program. Neither of these previous efforts satisfy the registration requirements of the Groundwater Protection Act and agricultural drainage well owners must register each well by sending in the registration form provided.

Q: What happens if I don't register an agricultural drainage well?

A: Agricultural drainage wells owners who don't comply with the January 1, 1988 registration deadline won't be eligible for any financial assistance money which has been provided by the Legislature for

implementing alternatives to agricultural drainage wells. Since it is quite possible that existing drainage wells will have to be closed or substantially modified, drainage well owners should preserve their right to be eligible for that financial assistance by registering their wells by January 1, 1988.

Q: How do I register an agricultural drainage well?

A: Registration forms are being provided by the Department of Natural Resources and can be obtained from your County Board of Supervisors, or from the Department of Natural Resources central office in Des Moines (Wallace State Office Building, Des Moines, Iowa 50319, 515/281-5154). Simply fill out the registration form and send it to the Department of Natural Resources. There is no registration fee.

Q: What will happen to agricultural drainage wells? Will they have to be closed?

A: That depends upon the outcome of a pilot demonstration and research project by the Department of Agriculture and Land Stewardship. The project will look at various aspects of agricultural drainage wells, including alternatives to the use of drainage wells. At this point it is simply not known if agricultural drainage wells can continue to be used if the goal of eliminating contamination of the State's groundwater is to be reached. Agricultural drainage well owners will have until July 1, 1991 to develop a plan, in consultation with the Department of Natural Resources and the Department of Agricultural and Land Stewardship, which proposes alternatives to the use of drainage wells.

Q: Can existing agricultural drainage wells continue to be used?

A: Until such time as agricultural drainage well owners are notified otherwise, agricultural drainage wells can continue to be used. It likely will be after July, 1991 before most well owners will have to do anything beyond register and develop a plan for alternatives. However, if a specific agricultural drainage well was causing known contamination of a well supplying drinking water, the Department of Natural Resources might take action sooner on that particular drainage well. Drainage well owners should consider it a definite possibility that some action (closure or substantial modification) will eventually be required and should be thinking about alternatives in the interim.

Q: Can new agricultural drainage wells be constructed or existing ones rebuilt?

A: Not without a permit from the Department of Natural Resources. And in view of the standards imposed, it is unlikely a permit would be granted. Emergency repairs can be made provided the County Board of Supervisors or its designee approves the repairs. The Board must base its approval on the following conditions:

- the well has been registered with the DNR.
- management practices are instituted which will reduce the level of chemical contamination of the water which drains into the well.
- a statement from the owner is submitted which states the repairs are necessary and do not constitute a basis to avoid the eventual closure of the well if closure is later determined to be necessary.

Q: What happens if agricultural drainage wells have to be closed? Won't affected landowners suffer a financial loss?

A: The legislature has provided for funds to assist in implementing alternatives to agricultural drainage wells or to acquire wetlands or conservation easements on and around wetlands that result from the closure or change in use of agricultural drainage wells. The details of such assistance have yet to be worked out.

Q: What about sinkholes? Aren't they sources of contamination?

A: Sinkholes, which occur naturally, can act like drainage wells in channeling agricultural chemicals into the groundwater. The Groundwater Protection Act requires that the Department of Agriculture and Land Stewardship develop a program to eliminate contamination from sinkholes. Unlike drainage wells, there is not a requirement for landowners to immediately notify the Department of Natural Resources of their presence and location even if tile water or surface drainage water runs directly into the sinkholes.